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ASSISTED BY

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OUR SEVENTH VOLUME.

With the present issue we enter upon the seventh year of our existence. On looking back over our past career, we see abundant reason for thankfulness and encouragement: from small beginnings we have grown to a respectable sized periodical, while in mechanical execution, typography, paper, &c., we give precedence to none. The completion of our past volume and the advent of the present number have been delayed by untoward circumstances beyond the time intended, but we are making a fresh start now, and hope by persevering effort to catch up lost time and issue regularly hereafter. To meet the wishes of several of our friends who desired to have certain material printed before the close of the sixth volume, we published last month a double number, consisting of forty pages with index added, so that our readers have been dealt with more liberally than we had promised, having received a volume of 260 instead of 240 pages. Many kind friends have helped us in the past with their contributions, and we gratefully observe that the number of helpers is increasing, as is shown by the recently issued list of contributors to the sixth volume; we trust that none of these will weary in well-doing, but continue their needed assistance and enlist their friends as far as possible in the same service. Original observations on the habits and life history of insects are especially desired, to make our journal still more useful and interesting. With the kind aid of our coadjutors, we shall endeavor to continue the papers on our common insects, which will, as heretofore, be accompanied by suitable illustrations, and shall, as far as possible, provide in each issue other material which will interest the general reader.

We would also take this opportunity of reminding our subscribers that subscriptions for the new volume are now due, and will be thankfully received by the Secretary, Mr. J. H. McMechan, London, Ont. It is with pleasure, also, that we inform our many correspondents that by the recent postal arrangements entered into by the United States and Canadian authorities, all letters mailed after the first of February will require a three cent stamp only to carry them from any part of the States to any part of Canada and *vice versa*, instead of six cents, as heretofore; post cards also will pass from one country to the other without the additional stamp.

CATOCALA NEBRASKÆ, Dodge.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Expanse, 2.70 inches. Primaries scalloped, apparently brown, being densely sprinkled with black scales on a reddish gray ground. Reniform tinged with red, clouded anteriorly with black, and having a black central spot. Sub-reniform indistinct. Terminal line nearly obsolete, the grayish band which precedes it showing plainest on the costa. All the transverse lines are black, and a curved row of seven black dots appears on the interspaces along the outer margin. Fringe dark, tipped with white.

Secondaries red, of about the same shade as appears in *C. parta*. Median band not much curved, and of nearly the same width as appears in *C. unijuga*, excavated anteriorly at the extremity of the discal cell, slightly constricted just after crossing the first median venule, and ends abruptly at the submedian vein; a few scattered scales appear beyond. Marginal band of medium width; even on inner edge, excavated opposite the termination of the median band, and ends about half way between the submedian and internal veins. Apex white, tinged with red.

Fringe white, spotted with black, which color predominates at the anal angle. Thorax same color as primaries. Abdomen clear brown, three of the segments tipped with white. Beneath, the general appearance much as in allied species. Median band of secondaries ends at submedian vein.

Taken at Glencoe, Dodge County, Nebraska, in August, 1874. Mr. Grote informs me that this species seems to be related to *Catocala Californica*.

NOTE ON CATOCALA NEBRASKÆ, BY A. R. GROTE, BUFFALO, N. Y.

Mr. Dodge has sent me a specimen of this species, recently discovered by himself. It is closely allied to the European *C. nupta*. It differs by the greater obliquity of the t. p. line and the shallower submedian sinus. The fore wings are otherwise quite similar in color and design, while the lines are more deeply black marked in *Nebraskæ*. The hind wings differ by the greater narrowness of the terminal band, and notably by the narrower, more rounded and non-angulated median fascia. The species seem to be related somewhat as *C. elocata* of Europe and *C. Walshii* of

North America. Perhaps it is this species (*C. Nebraskæ*) that has led Mr. Strecker (who has shown himself on other occasions to be inexact) to record "*C. nupta*" as being found in North America. I will remark here that Mr. Strecker's statement that the Californian species of *Nemophila* are identical with the European *Russula*, is contradicted by their description as distinct by Dr. Boisduval, who should be well acquainted with the variations of the European form. The statement that *Eupsychoma geometrica* is the exact equivalent of Mr. Walker's *N. petrosa*, made by Mr. Strecker, is erroneous, and is probably a careless rendering of Dr. Packard's previous statement that the two were probably forms of the same species. In *geometrica* the hind wings are entirely *black*; in *petrosa* (the type of which I saw in the British Museum) the hind wings are *white* or *yellowish*, with black markings. In my opinion it will eventuate that we have several species of *Nemophila* in our Western regions, none of them identical with *plantaginis*, and probably some of them (i. e. *Eupsychoma geometrica*) to be distinguished structurally, and therefore generically from *cæspitis* and *cichorii* and *plantaginis*.

CAPTURES OF NOCTUIDÆ AT ST. CATHARINES, ONT.

BY GEO. NORMAN, ST. CATHARINES, ONT.

In the spring of this year I commenced collecting the *Noctuæ* of this part of Canada, and in the hope that a list of my captures, with the dates of appearance, may be of interest, I venture to send the same for publication.

Being a stranger to the insect fauna of N. America, and in the absence of anything like a manual of the Heterocera, I should, even with the assistance of the Brit. Mus. Catalogues and Guenée's work, have had great difficulty in identifying my specimens. Fortunately this difficulty was removed by Mr. Grote, of Buffalo, who, in the kindest manner, has from time to time named my material. For this courteous assistance I am under lasting obligations. I have thought it advisable not in all cases to adopt the genera of Mr. Grote's "List of N. American Noctuidæ," for in the unsettled state of nomenclature at present existing, I prefer the arrangement of M. Guenée. This I, moreover do, for reasons not neces-

sary here to mention. It will be observed there are in my list several species, and even some genera, hitherto new to science; these have in nearly all cases been published by Mr. Grote in various journals. Many of the Homopteridæ I have omitted altogether, as it seems hopeless to identify them by the meagre descriptions existing. Finally, Mr. Grote has several specimens yet undetermined, which will have to be added to the list.

Thyatira cymatophoroides—14th July; at sugar; not common.

———*expultrix*—23rd June to July; not common.

Raphia frater—25th June; rare; at sugar.

Acronycta occidentalis—2nd June to August; common; at sugar and at rest.

———*morula*—10th July; rare; at rest.

———*connecta*—12th August; rare; at sugar.

———*hastulifera*—26th June; not common; at rest.

———*dactylina*—24th July; rare; at sugar.

———*brumosa*—17th May to August; at rest and at sugar; not uncommon.

———*Verrilli*—20th July; rare; at sugar.

———*noctivaga*—6th June to August; rare; at light and at sugar.

———*superans*—25th June and July; not unfrequent; at sugar.

———*ovata*—18th June; bred; rare; at sugar.

———*subochrea*. *N. sp.*—2nd July; rare; at sugar.

———*dissecta*—17th June; two specimens at rest.

———*oblinita*—26th May; rest; very frequent; a second brood in August; cocoons frequent on palings.

Bryophila lepidula—19th July; rare at sugar.

———*palliatricula*—29th June; frequent; at rest and at sugar.

Noctua sigmoides—29th June to August; not unfrequent; at sugar.

———*augur*—3rd July; eommon; at sugar.

———*baja*—3rd August to September; very common; at sugar.

———*C. nigrum*—11th June to September; very common; at sugar and light; specimens larger than in Europe.

———*bicarnea*—31st July to September; very frequent; at sugar and at lime blooms.

———*Normaniana*. *N. sp.*—21st July to September; frequent; at sugar. This has hitherto been, I believe, considered the same as *N. triangulum*. I am reminded much more of *N depuncta*, which seems its nearest ally.

Noctua clandestina—19th June to July; common; at sugar and lime blooms.

———*brunneicollis*—2nd July to September; rare; at sugar.

———*alternata*—1st July to September; very common; at sugar.

———*cupida*—17th July to August; frequent; at sugar.

———*rubi?*—4th August; rare; at sugar.

Agrotis herilis—31st July to September: very common: at rest, sugar and light.

——— *tricosa*—3rd August to September; very common; at rest, sugar and light.

——— *subgothica*—9th August to September; not so frequent as the above two species; at rest, sugar and light. All three species in abundance on flowers of Thistle *(Cirsium arvense)* and unexpanded flowers of *Verbascum thapsus.*

———*fennica*—10th August; one specimen at rest in the Montebello Gardens.

——— *gladiaria. N. sp.* Morr.–Sept. 5th: not unfrequent at sugar and light.

——— *tesselata*—29th June; bred from larva found in abundance at the roots of *Malva rotundifolia* in May; afterwards to 2nd of July, swarming; at sugar, rest and at lime blooms. Many remarkable aud beautiful varieties.

——— *Cochrani*—27th July; bred afterwards; common; at sugar and rest to September.

———*saucia*—14th August; not uncommon; at sugar.

——— *suffusa*—2nd June to October; swarming at sugar, flowers and light.

——— *venerabilis*—6th September; not uncommon; at light and sugar; also bred.

Aplecta pressa. N. sp—6th July; lime blooms and at rest; several.

——— *herbida*—27th June to September; common at rest; less frequent at sugar.

——— *nimbosa*—6th August; rare; at sugar.

——— *latex*—30th May to June; not uncommon; at rest.

Ammoconia badicollis—31st July; rare; at sugar.

Hadena subjuncta—2nd July; rare at sugar.

——— *vicina. N. sp.*—4th June; rare at sugar.

——— *confusa*—8th May; rare at palms.

Hadena albifusa—5th June to August; common at rest, flowers and sugar.
——— *claviplena*—9th July; rare at sugar.
——— *xylinoides*—23rd May to June; common at rest and at sugar; a second brood in August, smaller in size.
Dianthoecia meditata—11th August; not rare at sugar and at rest.
Mamestra arctica—22nd June to August; swarming at rest, and at sugar and lime blooms; also at light; bred from warty larvæ found under stones in May.
——— *devastator*—24th June to September. By far the most common moth here; a perfect nuisance at sugar.
Apamea jaspis—30th May to July; common at rest and at sugar.
——— *finitima*—10th June; common at rest; rarely at sugar.
——— *mactata*—31st August to September; common at rest and sugar.
——— *modica*—7th July to September; very common at rest and sugar.
——— *reniformis*—31st July to September; not uncommon at sugar.
Celæna herbimacula—23rd June to October; seemingly a succession of broods; very common at sugar, light and rest.
——— *chalcedonia*—25th June; rare at sugar.
Dipterygia pinastri—14th June; not common at sugar and at rest.
Xylophasia apamiformis—16th June; frequent at sugar and at rest.
——— *sputator*—4th July to September; common at sugar and bred.
——— *dubitans*—12th July; rare; one specimen in spider's web.
——— *lignicolor*—27th June to August; common at sugar and lime blooms.
——— *verbascoides*—9th July; rare; one specimen at sugar.
——— *sectilis*—12th June to August; not uncommon at sugar and rest.
——— *cariosa*—6th July; rare; one specimen at rest.
Cloantha ramosula—18th May; rest hybernated; 1st September, fresh specimen at rest; rare.
———*vomerina*—8th May; rare at Sallow Palms (*Salix caprea*).
Phlogophora periculosa—6th August; rare at sugar.
——— *iris*—9th June; rare at sugar.
Euplexia lucipara—2nd June to August; not common; at rest and sugar.
Nephelodes violans—1st September; common at light and sugar, but always in bad condition.
Luceria loculata—27th June; not uncommon at sugar.
Hydræcia lorea—16th June to July; common at light, flowers and sugar.
———*nictitans*—21st July to August; common at sugar; neither so variable nor so beautiful as European specimens.

(To be Continued.)

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 249, vol. vi.)

Since the preceding portion of this paper, as well as much of that which follows in this and some following numbers, were placed in the hands of the Editor of the CAN. ENT., I have received from Mr. Belfrage another collection of Tineina from Basque County, Texas, containing additional specimens of species found in the first collection, and several new species. The only species contained in this last collection which has been previously described from more Western localities, and were not contained in the former collection, are *Gelechia solaniella?* Cham. and *Strobisia iridipennella* Clem. and *Theisoa bifasciella*. The specimens of the first named differ somewhat from bred specimens from Kentucky and Missouri, so that I mark them doubtfully as of this species: I however believe them to be the same. *Strobisia venustella* Cham., I am now satisfied, is a synonym for *S. iridipennella* Clem. Because of the presence of several brilliant blue spots on the wings of my specimens, not mentioned in Dr. Clemens' description, I was led to believe that they belonged to a different species. But the individuals vary in this respect. Mr. Stainton, in his edition of the Clemens' papers, has corrected Dr. Clemens' description so far as it differed from specimens in his collection. Dr. Clemens' description was probably correct of the specimens observed by him. The single Texas specimen in this collection has a less number of the blue spots than any other that I have seen. I insert here a few descriptions of species contained in Mr. Belfrage's last collection, which are new, reserving for a future paper other new species and notes on those described in papers already in the hands of the Editor. The second collection was made in Basque County, Texas.

HYPONOMEUTA.

H. 5-punctella. N. sp.

Snowy white. On the forewings are five distinct, circular, black spots, three of them forming a line along the middle of the wing, the other two being in the dorsal half of the wing, one of them opposite the space between the first and second, and the other opposite the space between the second and third spots. The first spot is placed about the basal

fourth, the second about the middle, and the third about the apical fourth. Hind wings silvery white, tinged with gray. *Al. ex.* ¾ inch. Basque Co.

H. apicipunctella. N. sp.

I fear this specific name may at times prove mis-leading, as the apical black spot is small and may not be observed if the specimen is at all denuded.

Silvery white, the hind wings silvery, tinged with gray. There is a distinct black spot on the middle of the anterior margin of the thorax, one on each side of the tip of the thorax, and another on each side before the tip, and one on the patagia. On the forewings there is a black spot at the base, above but near to the fold, a little further back is one on the dorsal margin; above the fold and nearly opposite the second of these wing spots, are two others, one a little further back and nearer to the fold than the other. Further back on the fold is another, near to which, above the fold and about the middle of the wing, is another circular spot, larger than the others. Behind this spot are four others, forming a trapezoidal figure, and behind these, in the apical part of the wing, is a longitudinal spot or dash; there is also a similar dash on the dorsal margin, just before the ciliae. There are six black spots at the base of the dorsal ciliae, and five narrow black dashes along the base of the costal ciliae, and *there is a black spot at the tip of the ciliae* behind the row at their base. *Al. ex.* $\frac{11}{16}$ inch. Basque Co.

GRACILARIA.

I observe that by some error this generic name is in some preceding papers spelled with two l's. *Gracilaria* is the correct form of the word, and the same form is in use for a genus of Marine Algæ. I am not able to state which genus the name was first applied to. I will add here that the name of one of Dr. Clemens' genera *Aspidisca* is pre-occupied among the Infusoria *(Aspidisca, Ehrenberg.)*

G. Belfragella. N. sp.

Antennae purple brown; face and palpi white; the second joint of the maxillary palpi and the third joint of the labial pair tipped beneath with brown. Thorax and wings purple brown. The costal triangle is very pale lemon yellow, and reaches the fold, where it is somewhat trun-

cate: posteriorly it extends as a rather wide band along the costal margin to the ciliae. Sides of the thorax purple brown. Anterior and middle legs purple brown, with white tarsi: hind legs whitish, except the apical halves of the femora, which are purple brown. *Al. ex.* $\frac{5}{16}$ to $\frac{7}{16}$ inch. Basque Co.

NÆRA, *gen. nov.*

Second joint of the palpi with a projecting tuft, more nearly like that of a *Plutella* than that of any other genus known to me. When the tuft is removed from the second joint, the palpi resemble those of a *Laverna*, for which I at first mistook it, and the deception is the more readily believed because of the tufts of raised scales on the wings. The form and neuration of the hind wings is exactly that of *Cleodora cytisella*, as figured in *Ins. Brit.*, *v.* 3, while the fore wings, though a little narrower than those of *Gelechia rufescens loc. cit.*, have very nearly the same neuration. The antennae are more than half as long as the fore wings, with the basal joint short and hardly larger than the stalk, which tapers from the middle to the tip. The palpi are somewhat recurved, and long enough to reach the vertex, with the terminal joint a little fusiform, with the tip blunt. The head resembles that of a true *Laverna*, but the face is not so full.

N. fusco-cristatella. N. sp.

Head and face white: second joint of the palpi and the tuft more or less externally marked with dark brown, and the third joint with two brown annulations, one narrow and indistinct about the middle, and a wide one before the apex. The face is marked a little with brown about the base of the antennae, which are white, annulate with brown, and the sinal basal joint has two distinct brown annulations, one about its base, the other before its apex. The upper surface of the thorax and fore wings is ash gray, sometimes nearly white, and sometimes suffused with ochreous and brown, and when the thorax and base of the wings are not so suffused, then the white passes gradually into the gray or ochreous brown, deepening gradually to the apex. To the naked eye the greater number of individuals appear to have the thorax and basal fourth and the apical third of the fore wings ochreous or reddish brown, while the middle portion of the wings is white or yellowish white. There are on the fore wings four brown spots, the first placed on the base of the costa, with the others following in a line departing a little from the extreme costa:

opposite the space between the two last of these spots, and beneath the fold, is another small brown spot on the base, near the dorsal margin; there is also one on the apex of the thorax, and sometimes three or four obscure ones on the thorax before it. Beneath the fold, close to, but not touching it, at about half the wing length, is a tuft of raised scales, the anterior portion being brown and the posterior white. Behind the discal cell are two other tufts, opposite to each other, one within the costal margin and the other within the dorsal margin, and behind the space between these tufts are three or four narrow, longitudinal streaks of white and dark gray, and the dorsal margin behind the tuft is whitish. Behind the costal tuft is an oblique white costal streak, passing backwards *towards* a small whitish spot in the dorsal ciliae, and margined decidedly behind by dark brown; behind the margin of this streak the costal margin along the base of the ciliae is reddish ochreous, with three or four small white spots on the base of the ciliae, which are grayish brown. There is also a small brown spot on the costa just before the middle, and one on the disc behind it. *Al. ex.* ⅜ to ½ inch. Waco and Basque Co.

BUTALIS.

B. buristriga. N. sp.

Dark purple brown, with a narrow yellow streak along the middle of the fold, which is sometimes interrupted. *Al. ex.* ½ inch. Season, October.

B. dorsipallidella. N. sp.

Dark purple brown; the base of the primaries and the dorsal margin to the fold, pale ochreous yellow faintly suffused with purplish. *Al. ex.* ½ inch. Season, April.

B. immaculatella. N. sp.

Dark bronzy brown, somewhat iridescent; the second joint of the palpi a little pale beneath. *Al. ex.* ½ inch. Season, April.

The two following species I have been unable to separate from *Butalis* otherwise than by the ornamentation, which is altogether different from that of the other species.

B. plausipenella. N. sp.

Very pale ochreous yellow, nearly white; the second joint of the antennae stained with fuscous towards the apex, and a fuscous annulus

around the middle of the third joint. Primaries obscurely streaked with pale fuscous between the veins. *Al. ex.* ½ inch.

B. albapenella. N. sp.

White, with a very faint ochreous tinge. *Al. ex.* ⅓ inch. Season July

GLAUCE, *gen. nov.*

The species for which this genus is erected is congeneric with, or, at least, is closely allied to some species of *Gelechia*, and but for the peculiarities of the secondaries, I should have placed it in that indefinite group.

Head and face smooth; scales appressed; face broad, somewhat retreating; antennae more than half as long as the wings, stalk simple, basal joint elongate but not enlarged; tongue moderately long, scaled; no maxillary palpi: labial palpi recurved, divaricating, overarching the vertex; third joint pointed, nearly as long as the second, which is scarcely thickened beneath.

Primaries lanceolate; cell closed, short and narrow; costal vein short; the subcostal sends two veins to the costal margin from behind the middle, one from the end of the cell, and the apical branch, which is trifid, the first branch going to the dorsal margin, the other two to the costal margin; the median subdivides into four branches from the hinder part of the cell; the discal is short, with no branch, and the submedian is furcate at the base.

Secondaries a little narrower than the primaries, with the posterior margin excised beneath the tip; *the costal margin from the base to the middle is armed with a row of stiff, sharp, two-edged bristles, passing gradually towards the middle of the costa into large scales*, and is slightly excised from the middle to the tip. *The cell is closed, short and wide*, the discal vein being placed about the middle of the wing, long and without any distinct branch. The subcostal is straight and furcate before the tip, one branch going to each margin. A branch of the discal vein or a fold is faintly indicated, and is continued through the cell to the base: the median gives off a short branch before its middle, and three from the end of the cell; submedian somewhat distinct, internal obsolete; there is also a faintly indicated vein or fold through the middle of the cell from the base, touching the median between its last two branches.

G. pectenalædla. N. sp.

The ground color appears to be pale yellowish, but it is almost entirely obscured by dense fuscous dusting and fuscous spots; apex of the primaries more deeply fuscous; head a little iridescent; antennae annulate with sordid yellowish. *Al. ex.* ⅝ inch. Season, September.

(To be Continued.)

THE MEXICAN HONEY ANT.

(Myrmecocystus Mexicanus.)

BY THE EDITOR.

During the summer of 1873 we received from an esteemed correspondent, Mr. Jacob Krummeck, residing in Santa Fe, New Mexico, several packages of this most curious insect, accompanied by letters giving interesting details of their habits and of the uses to which the

Fig. 1.

honey they secrete is put. In fig. 1 our readers will find excellent figures of a worker, a honey secreter and cocoons, commonly known as eggs, drawn by Miss Peart, of Philadelphia. At the meeting of the American Pharmaceutical Association, held in Baltimore in 1873, we presented a paper on this insect, from which we quote the following:

Very little can be found in Entomological works relating to this insect. Some thirty years ago, a Belgian naturalist, M. Wesmael, received specimens from a party travelling in Mexico, and published some observations on it in the fifth volume of the Bulletin of the Royal Academy of Brussels, giving it the name of *Myrmecocystus Mexicanus*. The discoverer found them very common near the town of Dolores, where they were known under the native name of Busileras. He states that they live in underground nests, which are not distinguishable from without. In early life none of these insects present any unusual distension of the body, but when arrived at a certain period of maturity some individuals begin to

show a distended abdomen, which after a time becomes swollen into a comparatively immense sphere, produced by the distension of the membrane connecting the abdominal segments, this sphere or sac being filled with a sort of honey. Another class of individuals in the community, raised from the same brood of eggs, manifest no tendency of this sort, but retain the usual normal form of abdomen. Both these classes of ants are neuters. When the sacs of the honey-producers are full they are somewhat like a transparent bubble of a yellowish color. They are unable in consequence of their immense burden to leave their nests, and are necessarily almost inactive, remaining fixed or suspended to the floors of the galleries of their nests elaborating this honey, which, it is said, they subsequently discharge into cells similar to those of the hive. It is also stated that the women and children dig them up and enjoy their honey, and that it is by no means unusual for these insects to be served at table, the head and thorax with the legs being removed, when the distended abdomens are eaten as a delicate sweetmeat. The neuter ant without the distended abdomen is the active worker in the establishment.

Our friend Krummeck informs us that they are found in considerable numbers in the mountains around Santa Fe: that the honey ants are unable to move and are fed by the active workers. He says, "I have sat by their nests and watched them working, for, at one time, six or seven hours: the workers carry leaves of different plants home, to feed, as I suppose, the others that produce the honey." Mr. Krummeck has tried to procure us specimens of the plants on which this insect feeds, but has not yet succeeded. He does not think that the honey is deposited by these honey ants in cells, as has been stated, but that they keep the fluid in their bodies, and the workers feed from them, and that when the honey in the sac of an individual is exhausted, it dies. In reference to the uses made of this honey in New Mexico, he says that the natives make a very pleasant drink of it, which is made in the proportion of three or four drachms of the honey to six ounces of water. It has no commercial value, is not brought to market, but simply made for their own use. They use this drink among themselves in the mountains in cases of fever, where medical attendance cannot be obtained. The honey is also used by them as a cure for eye diseases, especially for cataract.

Being very anxious to see this insect alive, Mr. Krummeck very kindly did his best to gratify us in this particular, having twice sent us boxes of living specimens, but the unavoidable delay and knocking about

attendant on so long a journey by mail, has in each case resulted in the death of all the ants before they reached their destination, the packages being literally soaked with the honey which had escaped from their bodies.

ON SOME OF OUR COMMON INSECTS.

THE GREEN GRAPE VINE WORM Amphipyra pyramidoides.

BY THE EDITOR.

The caterpillar of this species, shown in fig. 2, is occasionally very destructive to the grape vine, with us more particularly affecting those

Fig. 2.

grown under glass, although it is not by any means confined to this plant, feeding readily on the plum, pear, thorn, raspberry and poplar. The larva is found early in June, and is full grown usually about the middle of the month. Its length is from one and a quarter to one and a half inches, the body tapering towards the front and thickened behind. The head is rather small, flattened in front, and of a whitish green color, with the jaws or mandibles tipped with black. The body is whitish green, a little darker on the sides, with a white stripe down the back, a little broken between the segments and widening somewhat behind. There is a bright yellow stripe on each side close to the under surface, which is most distinct on the hinder segments, and a second one of the same color, but fainter, half way between this and the dorsal line; this latter is more distinct on the posterior portion of the body, and follows the peculiar prominence on the twelfth segment, as shown in the figure. The under side of the body is pale green.

When full grown, this caterpillar changes to a dark brown chrysalis, either at or a little under the surface of the ground, from which the moth

appears in the latter part of July. This moth, which is represented in fig. 3, measures, when its wings are expanded, about one and three quarter

Fig. 3.

inches; the fore wings are dark brown, shaded with paler brown, and with dots and wavy lines of dull white. The hind wings are reddish with almost a coppery lustre, becoming brown on the outer angle of the front edge of the wing, and paler towards the hinder and inner angle. The under surface of the wings is much lighter in color than the upper: the body is dark brown, with the hinder portion banded with lines of a paler hue.

CORRESPONDENCE.

DEAR SIR,—

Mr. A. R. Grote has published a paper in the "Bulletin of the Buffalo Society of Natural Sciences," in which some statements are made which call for correction on my part. I shall not allude to his personal remarks, similar in character to those which he has made concerning others who have ventured to criticize his scientific work or to correct his mistakes: but to the palpable blunders into which he has fallen with respect to some species recently described by me in the Proceedings of the Boston Society of Natural History. The following is a list of those of my species which were corrected (sic) by Mr. Grote: *Hadena rasilis, H. vulgivaga, Glaea sericea, Agrotis exertistigma, Xanthoptera nigrocaput, Copipanolis vernalis* and *Mamestra illabefacta.*

Mr. Grote states that my *H. rasilis* is a re-description of *Elaphria grata* Hübn., referred by him in the List to Caradrina! If Mr. Grote will examine Hübner's figure, he will see that it represents a much larger, stouter, and entirely different insect. Mr. Grote has apparently overlooked

the fact that it is an excellent representation of the common species determined as *Taeniocampa oviduca* in collections: this, therefore, should be considered a synonym of *grata*, and *rasilis* remain a distinct species of *Hadena*.

My comparisons were made with two copies of the "Zutrarge;" a fine one in the library of Mr. S. H. Scudder, and another more coarsely colored in that of Harvard University.

Mr. Grote remarks that my *Hadena vulgivaga* is probably a re-description of *H. apamiformis* Guen. I am perfectly well acquainted with Guenée's species, and *vulgivaga* has not the slightest resemblance to it; it is, as I mention in the description, a new species allied to *H. rurea*.

Mr. Grote states that my *Glaea sericea* seems to be founded on a specimen sent him for determination, and which he considered identical with his *Orthosia? apiata*. I never sent a specimen of *Glaea sericea* to Mr. Grote, and the species is entirely distinct from *apiata*. I did send Mr. Grote a variety of *apiata* for comparison with his type, and this he has probably confounded with *sericea*.

Mr. Grote remarks that my *Agrotis exertistigma* is probably only a Californian variety of *alternata*. After re-examining my material, consisting of two specimens of the former species and about twenty of the latter from Nebraska to Canada, I do not see any reason to change my opinion, but I should be happy to do so if Mr. Grote can prove the species identical.

Mr. Grote refers my *Xanthoptera nigrocaput* as a synonymn of *X. Ridingsii* Riley. The fact is that the author's copies of the first signature of Mr. Riley's paper, containing the name and a few lines of the description of his new *Xanthoptera*, were distributed some time before my paper appeared (I did not receive a copy, however, until January, 1875). The second signature, containing the larger part of the description, has not yet appeared, to my knowledge (Jan. 25th, 1875.)

Mr. Grote's attention having been called by me to his erroneous arrangement of the species of *Xanthoptera*, he at once improves the opportunity to found a new genus, *Exyra*. It is obvious that this genus (even if a needful one) can not stand, as it is not accompanied by a word of generic diagnosis.

In a similar manner he founds a new genus for my *semiapata*, after having only a month before (see Proc. Ac. Nat. Sci., Phil., 7, 206, 1874) entirely mistaken its generic characters and placed it in *Apamea*.

Mr. Grote states that my *Copipanolis vernalis* is a re-description of his *Eutelype Rolandi*. The fact is, Mr. Grote has priority by one day (his paper was read Nov. 3rd. and mine Nov. 4th.) In the same papers were published *Apamea purpuripennis* Grote and *Orthosia baliola* Morr.: these species are synonyms and Mr. Grote's name has priority.

Lastly, Mr. Grote states that I have re-described Dr. Harvey's *Mamestra lilacina*. On the appearance of Dr. Harvey's description, I gave Mr. Grote a typical specimen of my species, and requested him to compare with the type of Dr. Harvey's species, and give his opinion. In his letter (which I should be glad to show to any one interested) he states unequivocally that the species are distinct, and on his word I published my description of *illabefacta*.

In this letter I have only referred to those mistakes of Mr. Grote's which, if allowed to remain unanswered, would create a wrong impression in regard to my work. I make no attack upon him or upon his work, although, if I were desirous of doing so, material would not be lacking.

The identification of specimens of the common *Agrotis messoria* Harris (already once re-described by Messrs Grote & Robinson as *A. repentis*) with *A. lycarum* Evers., a Siberian species, is an instance in point.

I am yours respectfully,

H. K. Morrison, Cambridge, Mass.

GLAUCOPSYCHE COUPERI Grote.

Dear Sir,—

As this butterfly has lately been figured as *Pembina* Edwards, the following remarks will settle the distinction between the two species:

"With regard to the *Lycaena* from Anticosti, I presume Mr. Scudder is correct. The original *Pembina* came from Lake Winnipeg, a single specimen or a single pair, several years ago. These types were afterwards lost in a box of insects sent by me to California. I had forgotten them, and some how, another species had been assumed to be *Pembina* by Scudder and others, and I had fallen into the error myself of thinking with them that *Pembina* was allied to *Lygdamus*. I discovered the fact last year, and called Mr. Scudder's attention to it. I think this *Couperi* was what had been thought to be *Pembina*, and Grote was correct in naming it *Couperi*."

Mr. Scudder writes October 10th, 1874, as follows:

"I formerly believed this to be *Pembina*, having received it from Edwards with that determination. I therefore named some of your first lot (as Mr. Mead says) *Pembina*. Afterwards I received a lot from your subsequent journeys, sent me by Grote. The specimens were poor and much rubbed, and I thought when I determined them to be distinct from the so-called *Pembina*, that ♂ and ♀ alike had a broad marginal band. Mr. Edwards was the first to discover his own error, and drew my attention to it. We do not know *Pembina;* it is temporarily lost to science, but it will turn up one of these days. From Edwards' description and the context, it is plain that your butterflies are *not Pembina*. After *Couperi* was described, I saw many other and fresher specimens, and then discovered my mistake (accepted and published by Grote) about the distinction between your two lots of butterflies, and found that although Grote was in error in describing *Couperi* as distinct from the so-called *Pembina*, the *name* must stand because the first one, apart from *Pembina*, was given to an insect which was not *Pembina*.

"There are but two known species of *Glaucopsyche* in America:

"1. *Lygdamus* of the South.

"2. *Couperi* of the North, long supposed to be *Pembina* Edw., which however belongs to a distinct group."

PAPILIO BREVICAUDA, Saunders.

I have received specimens of this butterfly from Percé, district of Gaspé, the north shore of the Gulf of St. Lawrence.

Wm. Couper, 67, Bonaventure Street, Montreal.

COLIAS PHILODICE.

Dear Sir,—

Mr. W. H. Edwards informs me that Mr. Mead has determined by experiment that this species becomes crimson on the contact of the wings with cyanide in the collecting bottle. This accounts for a supposed variety of *philodice* sent me by an Entomological correspondent in good faith as having been collected by her. The lady reported that she had not particularly noticed the specimen at the time of capture, but on setting

her specimens she found that one of them had crimson patches on the wings. I have not seen any mention of the fact before in print, and as the illusion is very complete, owing to the brilliancy and thoroughness of the color, its true origin should be brought to notice, that others may not be deceived thereby. A. R. GROTE, Buffalo, N. Y.

DEAR SIR,—

On page 117, of vol. vi of your journal, Mr. Grote kindly furnishes us with a list of all the species of Noctuidæ common to this country and Europe, known to him. The following may, very safely, be added :

Ichthyura inclusa—Prob. *I. inversa* Packard.
Calocampa vetusta—New York, New Jersey, &c.
Graphiphora plecta Ochsen., N. Y., N. J.
Agrotis ypsilon = *A. suffusa; ypsilon* has priority.
Hadena chenopodii—New York, Michigan, New Jersey.
Calligenia miniata—New York.
Plusia urticæ—Penn.
Eugonia magnaria—Either *E. autumnalis* or *E. alniaria*, I forget which.

The last three I have received from Russia.

It may also interest your readers to know that *Danais archippus* is found in Queensland, without any variation that I can see. There is, too, a very suspicious resemblance between some of the Labrador species and those of Europe—for instance, between *C. phicomenes* and *C. nastes;* also between *C. pelidne* and our *C. philodice*. However, these require further investigation.

W. V. ANDREWS, New York.

DEAR SIR,—

A note on p. 92, vol. vi, CAN. ENT., states that Mr. Grote, of Soc. Nat. Sci, Buffalo, received specimens of Coliadae taken by me in 1873, on Anticosti. I wish this error corrected, as that gentleman had no *Colias* from the collection made that year on the island.

WM. COUPER, 67 Bonaventure St., Montreal, P. Q.

BOOK NOTICES.

The Distribution of Insects in New Hampshire, by Samuel H. Scudder—a chapter from the first volume of the final report upon the Geology of New Hampshire, pp. 53. with two plates and several wood-cuts.

The species of the Lepidopterous genus Pamphila, by Samuel H. Scudder, pp. 12, with one colored plate and one uncolored, from the Memoirs of the Boston Society of Natural History,

We have been favored by the author with copies of both the above papers, for which we tender him our sincere thanks. The first is a valuable contribution to the Entomology of New Hampshire, treating more particularly of the Butterflies and Gryllides. The second, besides valuable notes on the species enumerated, contains convenient tables, by the use of which the males and females of the various species may be readily determined. The colored plate, containing two figures, is a chromo-lithograph, nine stones having been used in producing the tints. The execution of this plate is excellent; the artists are Messrs. Sinclair & Son, of Philadelphia. The second plate illustrates the abdominal appendages of the males of eight species.

Entomological Contributions, No. 3, by J. A. Lintner, Albany, N. Y., with two photograph plates illustrating 12 species of Cucullia. We have already noticed this work in vol. 6, p. 120; the addition of the two excellent plates in the present copy adds much to its value.

BOOKS RECEIVED.

Note sur l'oeuf et le Jeune age de la Chenille D'Œneis aello, par Samuel H. Scudder, 8vo., pp. 4, with one plate.
Supplement to the List of North American Noctuidæ, by A. R. Grote, from Bul. Buf. Soc. Nat. Sci. pp. 15.
Proceedings of the Academy of Natural Sciences, Philadelphia, part 2, April—September, 1874, with three plates.
On the Habits of Some American Species of Birds, by Thos. G. Gentry, from the Proc. Acad. Nat. Sci., Philadelphia. 8vo., 14 p.
Proceedings of the Boston Society of Natural History, vol. xvii, part 1, May—October, 1874, pp. 128.
First Annual Report of the Ross County Horticultural Society, Chillicothe, Ohio.
Third Annual Report of the State Pomological Society of Michigan.
Monthly Report of the Department of Agriculture, Nov and Dec. 1874.
Bulletin Buff. Soc. Nat. Sci., vol. 2, No. 3, September, 1874.
Nature to Jan'y 14, 1875.
Science Gossip to Jan'y, 1875.
The Zoologist to Jan'y, 1875.
Newman's Entomologist to Jan'y, 1875.
The Scottish Naturalist, Jan'y, 1875.
Journal of the Agricultural and Arts Association, November, 1874.
Journal of Education to Dec., 1874.
The Canada Farmer, Toronto, to Jan'y, 1875.
Psyche, The Indiana Farmer, The Prairie Farmer and Le Naturaiste Canadien.

The Canadian Entomologist.

VOL. VII. LONDON, ONT., FEBRUARY, 1875. No. 2

CAPTURES OF NOCTUIDÆ AT ST. CATHARINES, ONT.

BY GEO. NORMAN, ST. CATHARINES, ONT.

(Concluded from Page 6.)

Hydræcia sera—2nd July; very common; at sugar and light.
Gortyna cataphracta—September 22nd; bred in quantities from larvæ in the stems of *Arctium lappa*; also at rest.
Scolecocampa ligni—1st July; rare; at light.
Leucania Henrici—15th April; bred.
————*paltens*—2nd July; not common; lime blooms.
————*phragmitidicola*—7th June; not uncommon; at light and sugar.
————*commoides*—2nd July to August; common; at lime blooms, sugar and light.
————*unipuncta*—2nd June; very common; at sugar and light.
————*pseudargyria*—11th July; rare; at sugar.
Ufeus satyricus—20th July; rare; at sugar.
Caradrina miranda—2nd June; not uncommon; at light.
Amphipyra pyramidoides—24th July to August; common; at sugar.
————*tragopoginis*—13th July; not uncommon; at sugar.
Ceramica picta—7th June; bred; larvae afterwards on cabbages.
Matuta Catharina—*N. g. et sp.*—Dec. 29th, 1873, wing in spider's web 11th May, rare; at sallow palms.
Perigrapha Normani. *N. sp.*—11th May; rare; at sallow palms; June, one at sugar.
Tæniosea gentilis. *N. g. et sp.*—30th June; very common; at lime blooms, sugar and rest to August.
————*perbellis*. *N. sp.*—2nd July; rare; at rest.
Tæniocampa alia—2nd May to June; very common; at palms.
————*oviduca*—30th May; not unfrequent; at light.
Orthodes infirma—29th June; not unfrequent; at sugar and light.
————*cynica*—8th June; rare; at sugar.

Cirrhædia pampina—1st September; common all the month; at sugar.
Cerastis dectiva—21st September to October; common; at sugar.
——— *inulta*—18th September; rare; at sugar.
Orthosia infumata. N. sp.—18th August; not uncommon; at rest and sugar.
Xanthia ferruginoides—15th September to October; very common; sugar and with net.
——— *euroa*—9th September; not rare; at rest.
Scopelosoma Morrisoni—4th May; hybernated; common on palms; 18th October, fresh brood; rare; at rest.
———*devia, n. sp.*—10th May; rare; at sallows.
Gonoptera libatrix—4th May; hybernated; at rest. Fresh brood—June to October; not unfrequent; at sugar.
Xylina petulca—5th May; hybernated; at palms. Fresh specimens—11th September; common; at rest and sugar.
——— *ferrealis*—5th May; hybernated; at palms. Fresh brood—19th September; rare; at rest.
——— *Bethunei*—2nd May; hybernated; at palms. Fresh brood—7th September to October; common; at rest and sugar.
——— *disposita*—5th May; hybernated; at palms. Fresh brood—September to October; not uncommon; at rest and sugar.
——— *cinerea*—16th September; at rest and sugar; not rare.
——— *laticinerea*—2nd May; hybernated and very common; at palms and sugar. Fresh brood—seems later than the preceding species; 8th October; very numerous; at sugar and rest. I never took *cinerea* in the spring.
——— *tepida*—8th October; rare; at rest.
——— *pexata*—3rd May; hybernated; at palms. Fresh brood—16th September to October; frequent; at rest and sugar.
Calocampa nupera—10th May; hybernated; single specimen; at light.
Cucullia asteroides—7th June; common; at flowers and rest.
Crambodes talidiformis—13th June; rare; with net at raspberry blooms.
Adisophanes miscellus—2nd May; rare; at rest.
Plusiodonta compressipalpis—24th June; rare; with net over *Philadelphus coronarius*.

Placodes cinereola—19th June; not uncommon; at light.
Abrostola ovalis—16th August; rare; at light. Many larvæ of some *Abrostola* afterwards beaten from nettles.
Plusia aerea—20th June; rare; at light.
———*balluca*—June; rare; at light.
———*precationis*—3rd June to October: very common; at flowers and at rest.
———*simplex*—1st June; rare; with net over Lilac blooms.
———*mortuorum*—2nd August: rather scarce; at rest and over Thistle flowers *(Cnicus arvensis.)*
———*8-scripta*—1st September; rare; at rest.
———*ampla*—21st July; rare; with net over *Cnicus arvensis.*
Heliothis exprimens—5th June: rather frequent; over Lilac and *Weigelia rosea.*
Acontia candefacta—6th September; rare at light.
Oligia versicolor. N. g. et n. sp.—Rare; 23rd June; at rest.
Leptosia concinnimacula—1st June: common; at rest and at sugar.
Erastria carneola—1st June to September; very common; at rest and at sugar.
——— *synochitis*—25th June; rare; at rest.
——— *nigritula*—15th June; common at rest to July.
——— *muscosula*—9th June; very common; at rest and at sugar.
Chamyris cerinthia—29th June; rare; one pair at rest.
Drasteria erichtea—May 10th; common: at light and sugar to August.
———*erichto*—12th June; common; at rest, sugar and light.
Parallelia bistriaria—8th June: common; at rest and at sugar.
Parthenos nubilis—3rd June to September; very common; at rest and at sugar.
Catocala epione—27th July; rare; at sugar.
———*insolabilis*—29th June; rare; at rest.
———*residua*—1st August; not common; at sugar.
———*relicta*—4th August; common to September; at sugar and rest.
———*unijuga*—18th August; not rare; at sugar.
———*Briseis*—5th August to September; not uncommon; at sugar and at rest.
———*parta*—20th July to September; common; at rest and sugar.
———*ultronia*—11th July to August; very common; at rest and sugar.
———*concumbens*—4th August to September; very common; at rest and sugar.

Catocala amatrix—27th August to September; common; at rest and at sugar.
———*cara*—20th August to September; less common than last; at sugar and at rest.
———*innubens*—2nd August; very common; at rest and at sugar.
———*D. C.* var. *scintillans*—8th September; rare; at sugar.
———*ecrogama*—21st July to September; very common; at rest and at sugar.
———*neogama*—24th July to August; common; at sugar and at rest.
———*piatrix*—15th August; not rare; at sugar.
———*habilis*—20th August not uncommon; at sugar.
———*celebs. N. sp*—18th August; rare; one specimen at sugar; Strathsallow.
———*Clintoni*—11th July; rare; one specimen at sugar.
———*polygama*—8th July to August; very common; at sugar and at rest.
Homoptera lunata—2nd May to June; common; at rest and at sugar.
——— *Saundersii*—17th June; common; at rest and at sugar.
——— *edusa*—11th August to September; not uncommon; at sugar and at rest.
Ypsia undularis—23rd May to June; common; at sugar and at rest. Apparently a second brood in August.
Pseudaglossa lubricalis—10th July; common; at sugar and at lime blooms.
Epizeuxis Americalis—9th July; common; at sugar.
Chytolita morbidalis—23rd June; common; at sugar.
Palthis angulalis—24th June; rare; at sugar.
Bomolocha baltimoralis—21st June; very common; at rest and at sugar.
——— *abalienalis*—14th June; common; at rest and at sugar.
Hypena subrufalis—29th June; not common, at rest.
Platyhypena scabra—23rd July to October; common; at rest.

THE *Cossus* of the Greeks and Romans, which, at the time of the greatest luxury among the latter, was introduced at the tables of the rich, was the larva, or grub, of a large beetle that lives in the stems of trees, particularly the oak; and was, most probably, the larva of the Stag beetle, *Lucanus cervus.*—*Curious History of Insects.*

PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part III.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

21. Mamestra cinnabarina Grote *(ante.)*

Under the number 5574, Mr. Hy. Edwards sends six specimens which, in their yellow rufous color, resemble the European *M. fasciuncula;* they are distinguished by the paler hind wings, the white reniform and the absence of white outer shading to the t. p. line. The Californian species may be held to represent the European *M. strigilis.*

50. Zosteropoda hirtipes Grote *(ante.)*

Under the number 4408, Mr. Hy. Edwards sends the female of this interesting form. The hind wings are fuscous in the disc with a shaded fascia; they are without the gathering of longer hair on the veins, which characterize the male. The tibiæ are clothed with sparse and rather long hair, not tufted as in the male. The long pointed palpi are characteristic and the shape of the primaries and ornamentation are as in the male. By a clerical error I have given the eyes as "naked" in my original generic description. They are hairy, as in *Heliophila*, and this character, with the tufted legs, induced my approximation of the genera in the "List of the Noctuidæ of North America."

51. Agrotis euroides Grote, Proc. Acad. N. S., Phil., 1874, 202.

California, Mr. Behrens, No. 66; Vancouver, Mr. Hy. Edwards, No. 5576.

52. Agrotis gravis Grote, Bull. B. S. N. S., 2, 155.

Mendocino, Mr. Behrens, Nos. 83, 132; California, Mr. Hy. Edwards, No. 2622.

This species varies in tone. In two ♀ specimens the fore wings are yellow brown, with the stigmata concolorous. A ♂ specimen sent by Mr. Hy. Edwards from Vancouver, No. 5607, may belong here; the markings are obliterate and the primaries more rounded.

53. Agrotis lagena Grote.

♂. The specimen is much larger than *A. Hollemani*, hind wings paler and the ornamentation differs in detail, with a general great similarity. The resemblance to the Coloradian *Oncocnemis Chandleri* is so perfect that they can hardly be separated. Nevertheless, the *Oncocnemis* has unarmed tibiae, the fore tibiae alone with a terminal spine, whereas the *Agrotis* has all the tibiae armed, the fore tibiae with a double row of spines. The insect is also more whitish and larger. The antennae are simple, the eyes naked and lashed. Whitish gray, with longitudinal interspaceal striations of a darker tint, more prominent terminally. The stigmata are united, the decumbent open orbicular fusing with the reniform, so that a flask-shaped figure is produced longitudinally on the cell. A narrow black basal ray; a terminal series of blackish dots; the nervules accentuated. Hind wings whitish, soiled with fuscous; the nervures marked. Body pale, with a black line on the collar and inner edging to the tegulae. Palpi with the middle joint dark at the sides. Beneath whitish, without markings. Exp. 40 m. m. California, Mr. Hy. Edwards, No. 2256.

54. Agrotis clandestina (Harr.) Grote.

Two specimens from Nevada, under the number 5627, from Mr. Hy. Edwards. One specimen collected by the late Mr. Crotch, Mus. C. Z. Camb., from California.

55. Agrotis alternata Grote, List, p. 10.

Agrotis exsertistigma Morr., Proc. Bost. Soc. N. Hist. 1874, 166.

Mendocino, No. 4 (red label), Mr. Behrens; also sent under the No. 164.

The Californian specimens do not seem to me to belong to a different species. The character of the open orbicular is variable, as in one specimen it is shaped as in my Eastern specimens. The collar is brown in all my remaining Californian specimens. I forwarded Californian examples of this species to Mr. Morrison with this determination, although this circumstance is not mentioned (as should have been done) in Mr. Morrison's paper. This is a very variable species; one Californian specimen has the forewings unicolorous pale brown, without markings. Others have no trace of the claviform, and the median space is not shaded with black, showing that Mr. Morrison's characters for his species are invalid.

56. Agrotis cupida Grote.

A single specimen, without number, sent by Mr. Behrens, belongs apparently to this species.

57. Agrotis subgothica (Haw).

Agrotis jaculifera Guen.

Two fresh specimens sent by Mr. Hy. Edwards under the number 4656, from Vancouver Island. The colors are more intense, else I see no differences from our Eastern material.

22. Mamestra illaudibilis Grote.

Mamestra laudabilis Grote, Ante p. 157.

Both sexes are sent by Mr. Hy. Edwards, from Vancouver Island of this species, which agrees in size with the Eastern *laudabilis*, and in the lunulations of the median lines. The Western species differs by the tegulae being lined with black, by the median space being wholly black, by the sub-basal and sub-terminal spaces being greenish white, and apparently by the smaller reniform. The bright green tint of *laudabilis* is wanting. The white hind wings have the median nervules soiled with fuscous, and the ♀ has a blackish clouding in the disc. The abdomen is whitish, over fuscous. California; Vancouver Island, Nos. 5580 and 5581, Mr. Hy. Edwards.

58. Mamestra oliracea Morr., Proc. Bost. Soc. N. Hist., 1874, 143.

To this species I would refer a specimen from Colorado, sent by Mr. Theo. L. Mead, under the No. 41, one from Canada sent by Mr. Saunders, and two from Vancouver Island sent by Mr. Hy. Edwards, under the No. 5580. It is distinguishable from *M. 4-lineata*, *M. laudabilis* and *M. illaudabilis* by the fuscous hind wings, and from the two latter by the greater evenness of the median lines. It is a little larger than any of the other species and bears a certain resemblance to *Hadena modica*. Besides these, five specimens from Vancouver Island seem merely to differ by being a little smaller and more blackish, the fore wings a little shorter, the white subterminal line sometimes showing a ruddy and pale blotch before it, near the internal margin, and in one specimen the t. p. line tinted with reddish. They agree in the fuscous secondaries and in the comparative evenness of the median lines, while the median space varies a little in width. These latter specimens bear the number 5579.

39. Hadena divesta Grote, ante, 215.

Three fresh specimens from Vancouver Island, with the fore wings a little more brown than the Californian type. This handsome species may be recognized by the outward position of the t. p. line and its general straightness. It is allied to *atlantica*, *subjuncta*, etc., but is far prettier and has possibly a nearer European ally.

Vancouver Island, No. 5573, Mr. Hy. Edwards.

59. Hadena indirecta Grote.

This species resembles *H. divesta*, but the t. p. line is exserted on the median nervules, below which it runs inwardly, constricting the median space greatly inferiorly. The fore wings are more purely brown; the median space blackish. The W-shaped mark of the subterminal line obsolete, not distinct as in *divesta*. The orbicular is oblique and narrow, not rounded and full as in its ally. The hind wings are fuscous, with the line not as distinct as in *divesta*. There is a dark mark on the subterminal fold of primaries before the subterminal line, and the fold on the median space is also marked. The median lines are geminate, the veins beyond the t. p. line dark marked. There appears to be a dark basal mark continued along vein 1. *Expanse* 36 m. m. Two specimens, the male with simple antennae, in not the best condition, sent by Mr. Hy. Edwards from Vancouver Island, under the number 5588.

60. Actinotia Stewarti Grote.

The eyes are naked and the species is congeneric with the Eastern *ramosula*. The basal ray is broader. The pale reniform is closed with a V-shaped outward notch, and situated nearer to the t. p. line, which latter is visible as a continuous dark shade, angulate on the veins, from opposite the cell to internal margin. The orbicular is oblique, not longitudinal pale centered, black ringed, small. The wing is shaded with brown below the basal dash, and also below vein 2. The inferior zigzag portion of the t. a. line is visible. Hind wings darker than in *ramosula*, wholly fuscous. *Expanse* 30 m. m.

California, Mr. Hy. Edwards, No. 4567; named for my assistant, Mr. W. W. Stewart.

ON SOME OF OUR COMMON INSECTS.

THE CYLINDRICAL ORTHOSOMA—*Orthosoma cylindricum*, Fabr.

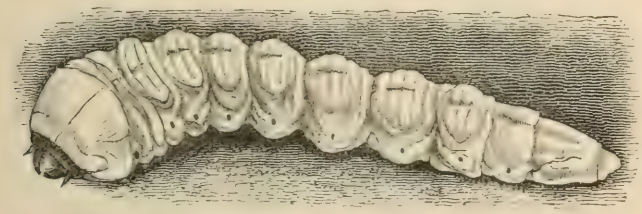
BY THE EDITOR.

This formidable looking, long-horned beetle, fig. 4, is very common in most portions of Ontario during the month of July. It flies at night with a rapid and noisy flight, entering the open windows of lighted rooms during the evenings, often to the great alarm of nervous inmates. This beetle measures an inch and a quarter, or even more in length, and is about one-third of an inch in width. Its body is long and narrow and of a light brown color, which assumes a darker shade on the head and antennae. The thorax is furnished with three sharp teeth on each side, and each wing case has three slightly raised ribs or lines.

Fig. 4.

The larva of this insect inhabits decaying pine wood, especially pine stumps, and is supposeed to be several years in completing its growth; it closely resembles the larva of its near relative, *Prionus laticollis*, shown in fig. 5 (after Riley.) This latter, however, differs somewhat in its habits and appetite,

Fig. 5.



seeming to prefer boring into and feeding on living roots, such as those of the Lombardy Poplar, Balm of Gilead, Apple, Pear, and especially roots of the Grape-vine, in the latter case frequently causing the sudden death of the vines attacked.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 12).

LAVERNA.

I have only examined the neuration of one of the species which I here place in this genus, but they are all evidently congeneric, and the neuration of *L. lyonetiella* while not that of *L. cephalonthiella*, nor of either of the three species figured in *Ins. Brit., v. 3.*, does not differ therefrom more than they differ from each other. The limits of the genus are perhaps not so clearly defined as might be wished in respect to the neuration and the raised tufts on the primaries, but as the genus is at present recognized, the proper location of these species is in it. The neuration of *L. cephalonthiella* is almost identical with that of *L. Staintoni*, the chief difference being that the cell of the hind wings is closed and the superior branch of the fork of the apical vein goes to the costal instead of the dorsal margin. The neuration of the primaries is identical with that of *Staintoni*, except that the submedian is furcate at both ends. In *L. lyonetiella* the neuration of the primaries is exactly that of *Staintoni*, but the secondaries are narrower, the costal vein is very long, attaining the margin beyond the end of the cell, which is closed ; the subcostal is obsolete from the base to the end of the cell, beyond which it is distinct and furcate, one branch going to the apex and the other to the dorsal margin ; the median divides into three equidistant branches ; the submedian and internal veins are distinct, thus resembling the neuration of Chauliodus perhaps as nearly as that of Laverna. It is, however, I think nearer that of *L. longiella.*

L. œnotheræella. N. sp.

Second joint of the palpi silvery white, with a dark brown spot beneath near the tip ; third joint silvery white, with the apex and a spot beneath at the base brown. Antennae pale yellowish : face, vertex, thorax and forewings silvery white, except as follows : there is a spot at the middle of the anterior margin of the thorax, one also at its tip, and four small ones forming a transverse row across the middle, all of which are shining dark brown ; there is also a similar spot at the base of the hind margin of the forewings, which to the naked eye appears to be on the margin of the thorax before the tip ; and there is another just within the dorsal margin

of the wing, just before the middle, and a small costal one a little further back. There is an irregular golden spot, sprinkled with brownish and containing a small tuft of raised scales, on the dorsal margin just before the ciliae, which sends backwards two narrow, oblique, golden streaks, one of which passes to the dorsal margin, and the other, which has some brown scales intermixed, passes back towards the middle of the apical part of the wing, where it becomes confluent with a median, short, straight golden or orange streak, and with a rather long, curved, oblique and narrow costal streak, which begins just before the ciliae and is of the same hue with the other streaks, except near the costa, where it is brown. These three streaks proceed no further after their union, stopping short of the apex; but behind them, in the middle of the apical part of the wing and extending along through the apex and apical ciliae, is another large dark brown streak; and on the costal margin are two large, oblique, reddish golden streaks, the first of which touches the three confluent streaks above mentioned and the dark brown streak in the apex; the second one appears to be faintly divided on the costa by a small white streak, and is narrowly margined behind by dark brown scales; and behind it is a triangular white spot in the ciliae. Beyond this white spot in the ciliae are two narrow, dark brown, oblique lines, diverging from a common point and reminding one of the 'hook' in some species of Gracilaria, and the similar appearance in Polyhymno, to which, in the ornamentation of the apical parts of the wings, this species bears considerable resemblance, as it also does to some species of Lyonetia in so far as the arrangement of these marks is concerned. The apical black streak is bordered behind by a short perpendicular streak of the same hue. Dorsal ciliae white, dusted with dark brown. First two pair of legs dark brown; the tarsi of the posterior pair are annulate with yellow, the legs otherwise silvery white, marked with black spots. Abdomen pale stramineous; secondaries pale yellowish fuscous; under side of primaries fuscous. *Al. ex.* nearly half an inch.

I have also received specimens of it from Miss Murtfeldt, of St. Louis, who bred it from a larva mining in the stalk of the so-called Primrose (*Œnothera Missouriensis*), and who sends me the following notes:

"The larva of this exquisite little moth may be found during the months of August and September boring the stems of *Œnothera Missouriensis*. It feeds upon the pith, leaving the tunnel in its wake filled with coarse powdery granules, and it does not seem to check the growth of the plant to any great extent.

"The larva is cylindrical in form, with the full complement of very short legs. When mature it measures from 0.45 to 0.50 inch in length, with a diameter of 0.08. Color, pale yellow immaculate, except for the transversely oblong brown spot on the first segment, which represents the cervical shield. The incisions are deep and abrupt, and under the lens the surface appears covered with shallow punctures or stippling. On the dorsum of each segment are two transverse ridges of minute warty elevations, each giving rise to a fine light hair. Head small, oblique, polished, dark, mottled with brown ; jaws a few shades paler.

"These larvae remain dormant in the stems over winter and until spring is quite advanced. They then cut holes through the sides of the stem to, but not through, the thin outer bark or cuticle, showing on the latter like a round transparent spot. The place of egress thus provided, the larvae return to the central burrow and enclose themselves in thick, tough cocoons of white silk in the midst of a loose web of the same material The pupa is rather thick and of a pinkish color, and the wing cases cover only the upper half of the abdomen. This state lasts from 20 to 25 days, the imagines appearing about the last of May."

I have before stated that Miss Murtfeldt has sent me *Gelechia superbella* from St. Louis. St. Louis is on the same parallel that we are on at Covington, but southern insects seem to extend further north along the shores of the Mississippi than along the Ohio. This seems to be especially true as to Southern Illinois. Neither of the two species *(œnotherœella* and *superbella)* are found in Northern Kentucky.

L. unicristatella. N. sp.

Palpi slender, white, with a narrow, obscure brownish annulation about the middle of the third joint and another near the apex. Head and antennae white. Base of the wings white, except on the costa, the white extending along the dorsal margin to a tuft of raised scales about the middle, but interrupted about the basal fourth by a projection to the dorsal margin of the ochreous and fuscous scales which cover the costal portion of the wing, extending to the fold. The scales of the tuft are white, tipped with dark brown, and immediately before it the white of the dorsal margin projects across the fold into the ochreous and fuscous portion of the wing. In the ochreous and fuscous portion those colors are intermixed with each other and with some white scales, and they spread over the apical part of the wing, where the white is increased in

quantity so as to form an indistinct, pale, irregular fascia at the beginning of the ciliae: at the apex the ochreous brown again prevails over the white. At the base of the costa the ochreous fuscous is very narrow. Posterior wings purplish fuscous; under surface and legs whitish, the legs marked with brownish on their anterior surfaces. *Al. ex.* $\frac{7}{16}$ inch.

L, rufocristatella. N. sp.

White; antennæ annulate with brown. There is a small reddish ochreous tuft on the disc before the middle of the primaries, behind which the wing is suffused with reddish ochreous; a larger tuft nearly opposite to the first one, and nearer to the dorsal margin, of the same hue with the first one, and another just within the dorsal margin opposite the beginning of the ciliae. Between this last tuft and the costa, and thence to the apex, the wing is suffused with reddish ochreous, sparingly dusted with fuscous. *Al. ex.* $\frac{7}{16}$ inch. Season, July.

L. ignotiliscella. N. sp.

No raised tufts on the wings. Silvery white, the costal margin about the middle dusted with pale purple and ochreous scales: an irregular streak or sinus of spots, which are connected by ochreous brown dusting, begins before the middle of the disc, and extends backwards, spreading over the apical part of the wing. *Al. ex.* $\frac{6}{16}$ inch. Season, September.

L. albocapitella. N. sp.

Head, thorax and base of the dorsal margin of the wings pure snowy white: antennæ purplish fuscous, iridescent; palpi white, stained externally with pale purplish fuscous; the white patch at the base of the dorsal margin of the primaries is posteriorly narrowly margined with dark brown, containing a small raised tuft on the margin. The remainder of the primaries are of an indescribable hue, composed of grayish brown ochreous and white scales intermixed, the former hue predominating, or rather, it is brown streaked with ochreous and sprinkled with white; there are three small tufts of dark brown raised scales, each anteriorly margined with white, the white followed by a margin of dark brown: two of them are on the disc before the middle, the other further back and nearer the dorsal margin, and behind it is a fourth tuft also near the dorsal margin: there is a short dark brown streak in the apical part of the wing, within the dorsal margin, and a small dark brown spot about the end of the disc. *Al. ex.* $\frac{7}{16}$ inch. Season, September.

L. parvicristatella. N. sp.

White, suffused with purplish brown; the second joint of the palpi suffused with purplish brown, and a brown annulus about the middle; antennae annulate with pale brown; primaries suffused with purplish brown, with an oblique brown streak beginning on the costa near the base, and extending nearly across the wing; another about the middle, crossing the wing, and a third less oblique and shorter about the beginning of the costal ciliae, and produced backwards along the middle of the apical part of the wing, interrupting an indistinct, angulated white fascia; these streaks are not continuous, but are rather composed of small purplish brown spots of slightly raised? scales, with a more distinct raised tuft near the dorsal margin in each of the first two streaks, and between the small spots the wing is more deeply suffused than elsewhere. Dorsal ciliae silvery, those of the apex suffused with purplish; there is a narrow streak of dark brown scales along the middle of the apex. *Al. ex.* ⅝ inch.

L. miscecalonella. N. sp.

White, suffused with ochreous yellow, with a raised tuft of the same hue in the middle of the disc on the primaries; basal third of the primaries (except the base of the dorsal margin) brown, with reddish ochreous scales intermixed, and containing two tufts of dark brown raised scales, one of which is close to the dorsal margin, and before it to the base the margin is of the general hue (white, suffused with reddish ochreous), dusted a little with reddish fuscous; opposite to the dorsal tuft, just within the costal margin, is another larger raised tuft; the middle part of the wing is yellowish white, and behind it the wing is deeply suffused with reddish ochreous, containing about its middle a tuft of dark brown scales; apical part of the wing suffused with reddish ochreous and fuscous; second joint of the palpi pale ochreous yellow, externally fuscous, and the third joint is dark fuscous, except at the base and extreme tip. *Al ex.* ½ inch. Season, May.

L. fuscocristatella. N. sp.

White; second joint of the palpi with two pale fuscous annulations; antennae white, annulate with fuscous; head and upper surface of the thorax white; there is a small dark brown spot on each side of the thorax, over the base of the wings; primaries white, with two small dark brown spots on the extreme costa at the base, two other larger ones just

within the costa behind them, one behind the other, and a small spot opposite the space between them, beneath the fold; the portion of the wing from the basal fourth to the end of the disc, included between the costa and the fold, is suffused with bluish fuscous scales, each of which under the microscope appears tipped with hoary, and the extreme costa is black; the wing beneath the fold is whitish; just before the middle is a lunate streak of dark brown raised scales, extending from the dorsal margin to the fold, and margined with white in the concavity behind; at the end of the disc are two other larger tufts of bluish brown raised scales, margined before by yellow ochreous, and opposite to them is a long, narrow, very oblique white costal streak, margined behind by a narrow, dark brown line, which separates it from a somewhat wider yellow ochreous streak, containing three small white costal streaks or spots; behind the tufts the wing is ochreous, streaked with fuscous. *Al. ex.* ½ inch. Season, June.

RECENT NOTES ON THE PHYLLOXERA FROM FOREIGN SOURCES.

[FROM "ENTOMOLOGICAL RECORD," BY TOWNEND GLOVER, IN MONTHLY REPORT OF THE U. S. DEPARTMENT OF AGRICULTURE.]

In November last, information was received from Henry Erni, United States consul at Basle, Switzerland, that the *Phylloxera vastatrix* had made its appearance near Geneva, and in December the following letter was received, which is published in full:

Referring you to my dispatch No. 95, about the appearance of the grape-root louse at Pregney, near Geneva, the riddle received lately an important solution, for the insect was discovered in the grape-houses of the Baron Rothschild, at his villa near Geneva. It is proved that some of these grape-vines were imported from England, in 1869, where the disease ocurred in grape-houses as early as 1863. From these facts the origin of the grape-louse at Pregney appears obvious.

At the meeting of the French Academy, on the 19th of October last, Professor Dumas stated that two substances had now been discovered

capable of destroying the Phylloxera: 1st, the sulpho-carbonate of potassa, and 2d, coal-tar. Neither of these would injure the grape-plant. Experiments made on a large scale at Cognac and Montpelier, France, by delegates of the academy, were highly efficient. Both ingredients are cheap, for the price of a kilogram of each does not exceed one franc. The sulpho-carbonate of potassa is dissolved in water up to 37° Baumé, and 80 cubic centimeter ($\frac{1}{80}$ liter) poured upon every diseased grape-root. The best time is in November and March, the ground at that time being moist and the insect sure to be in winter quarters. The expense per vine amounts to about 10 centimes. Applying coal-tar, each root receives about 2 kilograms of this liquid, when it will penetrate the ground about 2 feet deep. In both cases the grape-louse is effectually killed.

I am, sir, &c.,

H. Ernı, United States Consul.

We also give extracts from the report of the international congress of vineyardists, at Montpelier, France, October 28, 1874, on the same subject, from the Journal d'Agriculture Pratique, No. 46:

The floor was taken by Mr. H. Marès, permanent secretary of the agricultural society of Herault, and president of the ministerial commission. He commenced by recalling to mind the experiments of 1872 and 1873, with the Phylloxera, which were unsatisfactory on account of the invasion of the "pyrale." In 1872 a new experimental field was selected, near Montpelier, belonging to M. Michel Termand. The experiments commenced the 6th July, and comprise fifty-one methods, applied to squares of 25 vines each, the squares being separated by two rows of untreated vines, left to serve as means of comparison, and to prevent confusion in the effects of various modes of treatment. One hundred and forty methods have since been tried in the same vineyard, of which thirty-three were beneficial and nine injurious; the others appeared to have no effect. The most beneficial were as follows, the soil being chalky and ferruginous: Potassium sulphate disolved in urine; a mixture of the sulphurized manure of Berre, colza cake, and ferric sulphate; potassium sulphate dissolved in water; potash soap dissolved in water; soot; a mixture of farm-dung, wood-ashes, and ammonium hydrochlorate; cow-urine alone or with the addition of gas-tar. All the methods which have proved advantageous are also manurial, especially the salts of potash and ammonia. The injurious methods are those insecticides not manures, as carbonic sulphide, turpentine, petroleum, gas-tar, and phenic

acid not diluted. The committee came to this conclusion : that manures, especially those rich in potash and nitrogenous substances, benefitted the affected vines.

The trials were continued in 1874 on the thirty-three squares already improved, one-quarter of each being left to see if the improvement was permanent. The total number of experiments made was two hundred and fifty-nine, extending over two and one-half hectares. The squares which were benefitted in 1872 and 1873 have in some cases this year almost returned to their original vigor, but the Phylloxera has not disappeared.

As regards the fruit, the following treatment has given the best results : 1, Yard-dung, wood-ashes, and sal ammoniac. 2, Yard-dung, wood-ashes and fat lime. 3, Cow-urine and fish oil. 4, Cow-urine alone. 5, Oil-cake. 6, Potassium sulphate and urine. 7, Cow-urine and gas-tar. 8, Soot. 9, Sulphur, salt of Berre, ferric sulphate and colza cake. The vines surrounding the squares treated were also visibly affected.

The experience of 1874 confirms and completes the results of 1872 and 1873, showing a diseased vine may at least temporarily be restored to vigor by energetic treatment. The commission considers itself justified in asserting that manures, rich in potash and nitrogen, mixed with alkaline or earthy sulphates, refuse of salt-works, soot, wood-ashes, ammonia, or fat lime, have increased the productiveness of the vines and allowed the fruit to ripen.

According to M. Marès the vine-disease is the result of combined causes, and subject to several conditions, viz.: 1. The nature of the soil, as it effects the vine and the insect, frequently a determining condition. 2. The influence of climate on the vine, and also whether or not it favors the extension of the insect 3. The strength or vigor of growth of the vine itself, which varies according to the variety and mode of culture. The wild vine does not perish ; the stock nearest approaching it is hardly attacked.

M. Laliman spoke next, affirming that rooted American cuttings had been cultivated in localities where the Phylloxera had as yet failed to appear, either on the American or native stocks.

M. Planchon then discussed the American vines, dividing them into three principal groups : 1. The Labrusca ; berries with foxy taste. 2. Œstivalis ; berries small ; leaves deeply indented ; wooly on the veins. 3. Cordifolia, of which the Clinton is a variety ; leaves smooth, berries

small. The Scuppernong, derived from the Cordifolia, attains a prodigious developement, one stock covering one-third of a hectare, but it is too wild. All these resist the Phylloxera better than our varieties, perhaps because they have not been so long in a state of cultivation. The insect does not extend its ravages beyond the small roots of the American varieties. But while the American vines do extremely well in France, they should not be imported where Phylloxera is unknown, for fear of introducing it, as the speaker is decided in asserting that it originated in America.

M. Max Cornu gave a summary of his experiments. He confined himself to substances giving off poisonous vapors, among which sulphocarbonates gave the best results.

M. Bouchet de Bernard, in a communication, advocated grafting French vines on American stocks, thus obtaining good vines and roots capable of resisting the attacks of the Phylloxera. M. Leissoniere supported these ideas, asserting the positive inferiority of the American vines. M. Terrel de Chênes stated that during five or six weeks the Phylloxera left its subterranean abode and crawled up the stock, hiding under the bark six inches above the ground. M. Douysset told how well the American vines grew at Roquemaure. And the session terminated with a communication from M. Petit, of Nimes, who lauded the value of coal-tar against the Phylloxera.

At 8 o'clock, 29th October, the members assembled at Comedy Square, to visit the field of Las Sorres, and view with their own eyes the results spoken of by M. Marès. The experimental field should give some consolation to our brethren of the South, for the squares of green vines in the middle of general desolation show that the genius of man may triumph over the Phylloxera, as it already has over the Oidium.

The cellar of Saporta, belonging to M. Vialla, was visited, and the excursion terminated at the vineyard of M. Gaston Bazille, near Lattes. His yards join others not yet treated for the Phylloxera, and we can hardly describe the extraordinary difference in the vines. Here they are digging up the stocks to throw away ; there they are covered with leaves and vigorous branches. A part were treated with cow-urine and calcium sulphate, a part with urine alone. In another place, submersion has been tried with success, and new ditches are now being dug.

In the session of October 30, M. Lichtenstein continued an essay by M. Roessler, delegate of the Austrian government. In his country the

grape-growers believe the Phylloxera came from America. They are opposed to destroying the vines, and believe in studying the insect and fighting it with manure and phosphates, ammonia, and potash. This treatment succeeds in porous soils, and to obtain this porosity the learned delegate had made use of dynamite, raising the ground thus from a great depth without injuring the vines. He then puts some chalk and phosphorus at the foot of the stock and irrigates. A gas is disengaged by the humidity, which destroys great quantities of insects, and by this means he obtains a crop. M. Lichtenstein added to this communication the result of his personal observations, that from the 15th August to the 15th September the Phylloxera takes wing and departs. He was not able to distinguish the sexes, but there was a time when the insect laid an egg which gave birth to the mother of the legions which devastate the vineyards. At this time the insect is within reach, and should be destroyed. In studying the Phylloxera of the vine the speaker discovered the Phylloxera of the oak.

Viscount de Saint Trivier, delegate from the Rhone, gave a history of the progress of the Phylloxera in his neighborhood, where it appeared three years ago. He pulled up some vines in April and June, but found no Phylloxera; but in July they appeared, which fact made him think, with M. Cornu, that the temperature must be at least 15° cent. He obtained good results by covering the stocks with a sort of paste made of saw-dust and coal-tar. M. Denis employed boiling water, to which he added one-tenth of tobacco-waste.

M. Loubet did not believe in medicines, but advocated patient replanting till the disease disappeared of itself, as he believed it soon would.

CORRESPONDENCE.

INTERESTING CAPTURES.

Last summer, while camping out with a party of friends on some of the small lakes north of Lake Ontario, ostensibly for the purpose of fishing, I kept on the alert for entomological rarities, and was rewarded by the discovery of two specimens of a *Grapta*, which I immediately recognized as *G. satyrus* Edw., though much astonished at the occurrence of the species so far from its usual habitat—the Pacific coast and Sierras of California—and hitherto not found at all on this side of the Rocky Mountains. Yet they were unmistakeably *satyrus*, and Mr. Edwards, on receiving one of the specimens, corroborated my opinion in the matter.

With a somewhat quickened pulse I cautiously approached the first specimen noticed, and successfully netted it; the other was secured with more difficulty, being very wild and frequently flying far into the woods, and then after a few moments returning to the patch of milkweeds where first found.

The two specimens were taken on the 22nd of July, on the shores of Cameron Lake, in Victoria County, Ont., and were the only ones seen during a stay of over a month in the neighbourhood. They were found in company with many *G. progne* and *comma* of both varieties *(dryas* and *Harrisii.) Argynnis cybele* and *aphrodite* were found in considerable and about equal numbers, and several specimens of *Thecla strigosa* were taken at the same place. *G. satyrus* is readily distinguished from *comma* by the honey-yellow under surface and great distinctness of the tawny fulvous marking above, that of the hind wings never being obscured by shades of deeper brown. Several specimens of *Arctia (Euprepia) Americana* were taken at our camp fires at various times during our stay; it was necessary to wait, net in hand, and pounce upon them before they were able to reach the fire, as their motions were quite rapid. The first specimen obtained was fished out from the frying-pan while culinary operations were going on—of course ruined—but others were secured in good condition by holding lighted birch-bark torches out a little distance from the shore; the moths flew down into the water and were readily captured. Several hundred eggs were laid by females pinned in the collecting box, and quite a number of the larvæ lived till winter and are now hybernating; they showed no preference as to food, but like most Arctians, devoured almost any green thing within their reach. If they survive the winter I will hereafter give an account of their transformations.

THEODORE L. MEAD, Ithaca, N. Y.

Mr. Knetzing, of this city, has discovered a locality for *B. infans.* They are found in a clump of White Birch, north of the village of Hochelaga. I believe this is the first record of its occurrence in this Province. *B. infans* is closely allied to *B. parthenais* of Europe, the caterpillars of which also feed on White Birch.

Mr. Pearson, one of our members, was fortunate in procuring a fine specimen of *Samia Columbia* from a cocoon found by him at Hochelaga.

Biston ursarius was as prolific as ever last season on the Lombardy Poplar, while the trees were as leafless as in mid-winter.

WM. COUPER, 67 Bonaventure St., Montreal, P. Q.

The Canadian Entomologist.

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ON SOME OF OUR COMMON INSECTS.

THE BEAUTIFUL WOOD NYMPH—Eudryas grata.

BY THE EDITOR.

This moth (see fig. 6) is truly a beautiful creature. Its fore wings are creamy white with a glossy surface, with a wide brownish purple stripe along the anterior edge, reaching from the base to a little beyond the middle of the wing. On the outer margin is a broad band of the same hue, widening posteriorly, with a wavy white line running through it, composed of minute pearly dots or scales. It is bordered internally with dull deep green. The brownish purple band is continued along the hinder edge, but it is much narrower here and terminates a little before it reaches the base. There are also two brown spots, one round, the other reniform, near the middle of the wing, often so suffused with pearly white scales as to be indistinct above, but clear and striking on the under side.

Fig. 6.

Colors, creamy white and brownish purple

The hind wings are reddish yellow, with a broad brownish purple band along the outer margin, extending nearly to the outer angle, and powdered here and there with a few whitish pearly scales; there is also a faint dot on the middle of the wing which is reproduced more prominently on the under side. The under surface of both wings is reddish yellow. The head is black, and there is a wide black stripe down the back, merging into a series of spots of the same, which extend nearly the whole remaining length of body. The sides of the body are reddish yellow with a row of blackish dots close to the under surface. The fore legs are beautifully tufted with white, the shoulder covers also are white, and so is the under surface of the body.

When this moth is at rest—that is, during the day time—its wings are closed like a roof over its back, and its tufted fore legs are stretched out.

The insect passes the winter in the chrysalis state, emerging as a moth from the middle of June to the middle of July. The earliest recorded date we have of the appearance of the moth is June 25th. It is usually common during the last week in June and the first in July, when it may often be found in the day time fast asleep on the leaves of the grape vine.

Soon after the moths appear they begin to deposit their eggs. These are among the prettiest and most beautiful of insect eggs; at *e*, fig. 7 (after Riley) we have a view of the upper surface, and at *f* a side view of this charming object. It is round and very flat; its color is yellowish or greenish yellow, with an enclosed ring of black placed a little beyond the middle, and sometimes nearer to the outer margin. In the centre of the egg is a large, nearly round dot, and at a little distance from this a circle of smaller dots, from which arise a series of from 24 to 27 raised striae, diverging equally as they approach the outer edge, and crossed by many gracefully curving lines which interlace also the spaces between.

Fig. 7.

When mature, the young caterpillar escapes from the upper part of the egg, lifting the centre and rupturing the portion placed over the black ring. In some cases we have observed the egg shell to be eaten by the newly hatched larva; in others it remains almost untouched. The young larvae have a strange habit of twisting their hinder segments and throwing them forward, resting on the anterior segments in a curious manner. At this age they eat small holes all over the vine leaves in different parts; they are often solitary, but sometimes two or three may be found on a single leaf.

When mature, the full grown larva appears as at *a*, fig. 7; it is then nearly one and a half inches long, tapering towards the head, thickening towards the posterior extremity. The head is of an orange color, with a few round black dots and pale brownish hairs.

The body above is pale bluish, crossed by bands of orange and many lines of black. Each segment, excepting the terminal one, is crossed by an orange band, all of which are nearly uniform in width, excepting that

on the 12th segment, which is much wider. These are all more or less dotted with round black dots, from each one of which arises a single short brown hair. There are also crossing each segment six black lines, placed nearly at equal distances along each side, but with a wider space in the middle, where the orange band occurs. The twelfth segment is much raised, and the terminal one suddenly sloped. The under side is very like the upper, and also marked with orange and black; feet and prolegs orange, spotted with black.

The larvae feed on Virginia Creeper *(Ampelopsis quinquefolia)* as well as on the Grape-vine, and Mr. Bowles, of Montreal, has found them feeding on the Hop.

When full grown, they descend to seek some secure retreat in which to pass the chrysalis, or inactive stage of their existence. They are fond of boring into old pieces of wood, and in the chambers thus formed they find secure lodgment; they will also bore into corn-cobs. When rearing them we have supplied pieces of cork for this purpose, and have had as many as twenty-one chrysalids enclosed within two small bungs about 1½ inches in diameter, and one inch thick. The excavation is but little larger than the chrysalis which is to rest in it; it is not lined with silk, but is made moderately smooth and is furnished with a cap or cover composed of minute fragments of cork, formed into a sort of membrane by means of a glutinous secretion mixed with threads of silk. When nicely finished the surface of this cover is slightly glossy, the glossiness extending a little beyond the actual orifice, indicating that the glutinous matter has been of a thin consistence and has spread a little during its application. When the lid is lifted the head of the chrysalis is usually found quite close to it.

Fig. 8.

The chrysalis is about seven-tenths of an inch long, of a nearly uniform dark brown color, and roughened with small blackish points or granulations.

This insect is subject to the attacks of a parasite, a two-winged fly—a Tachina—probably the species known as the red-tailed Tachina fly, *Exorista leucania*, see fig. 8 (after Riley.) It is not much unlike the common house fly in appearance, is about a quarter of an inch long, with a white face, large reddish eyes, a dark hairy body with four, more or less distinct dark lines down the thorax, and patches of a greyish shade along the sides of the abdomen. The parent fly deposits

her eggs on the back of the caterpillar, usually a short distance behind the head, where they are cemented firmly by means of a peculiar secretion with which the insect is furnished. Three or four of these eggs are usually placed upon a single caterpillar, where, after a few days, they hatch, when the tiny worms eat their way through the skin into the interior of the body, where they feed upon the fatty matters, instinctively avoiding the vital organs. When the caterpillar is about full grown it dies, and from its body emerge these three or four full grown whitish grubs, which soon after their exit change to chrysalids. These are nearly one-fifth of an inch long, oval, smooth and of a dark brown color, from which in due time the perfect flies escape.

PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part IV.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

61. Prodenia præfica Grote.

Allied to the Eastern *lineatella;* a little larger, with broader wings. The hind wings are more obscure, in the female subfuscous. The markings are so nearly alike in the two that I do not find good differences. Nevertheless, the tone of the three Californian specimens is less bright, the whiiish apical shade is less defined, and the discal point beneath on the secondaries is evident and distinct, whereas it is wanting in *lineatella.* The extra basal and subterminal fields show a purply shading in *præfica. Expanse* 36 m. m.

California, No. 5568, Mr. Hy. Edwards; Mendocino, June, Mr. Behrens.

62. Himella furfurata Grote, Proc. Acad. N. S., Phil., 1874, p. 204.

Sauzalito, Mr. Behrens, Oct., Nos. 182 and 223.

The Californian specimens are a little darker than my type, more distinctly marked, the palpi distinctly blackish outwardly.

63. Pyrophila pyramidoides (Guen).

A specimen sent by Mr. Behrens does not differ from Eastern material.

64. Graphiphora pacifica (Harvey), Bul. Buff. S. N. S., 2, 120.

Sauzalito, February, Mr. Behrens, No. 27 (red label).

The specimens seem merely to differ from the European *incerta* and the Eastern *atia* in tone. It is possible that all three names refer to a single species.

65. Graphiphora arthrolita Harvey, Bul. Buff. S. N. S., 2, 275.

California, Nov., No. 208, Mr. Behrens.

66. Zotheca tranquilla Grote, Bul. Buff. S. N. S., 2, 69.

California, Mr. Hy. Edwards, No. 160.

67. Orthosia purpurea Grote, Bul. Buff. S. N. S., 2, 125.

Sauzalito, Oct., Nov., No. 3 (red label), Mr. Behrens.

68. Orthosia crispa Harvey.

Sauzalito, Oct., Nov., No. 5 (red label), Mr. Behrens.

69. Pseudorthosia variabilis Grote, Bul. Buff. S. N. S., 2, 161.

Sauzalito, Mr. Behrens, Nos. 166—168, 223, September to October. Very variable in color. Specimens range from a pale fawn with nearly immaculate primaries, through reddish brown to dark olive brown with distinct markings.

70. Glaea olirata Harvey, Bul. Buf. S. N. S., 2, 120.

California, Mr. Behrens, No. 9 (red label), September.

71. Xylomiges patalis Grote, Bul. Buf. S. N. S., 1, 144, pl. 4, fig. 11.

Mendocino, Mr. Behrens. No. 18 (red label); Vancouver Island, Mr. Hy. Edwards, No. 5586.

72. Xylomiges hiemalis Grote, Bul. Buff. S. N. S., 2, 71.

Oakland, January, Mr. Behrens, No. 18 (red label).

73. Xylomiges curialis Grote, Bul. Buff. S. N. S., 1, 143.

California, Mr. Behrens, No. 8.

74. Xylomiges crucialis Harvey, Bul. Buff. S. N. S., 2, 277.
California, No. 5575, Mr. Hy. Edwards.

75. Cucullia serraticornis Lintner, 26, Am. Rep. N. Y. State Cab., 174.
Cucullia matricaria Strecker.
California, Mr. Behrens, No. 5.

76. Adipsophanes miscellus Grote, Bul. Buff. S. N. S., 1, 181.
Californian specimens are labelled May 8th, by Mr. Behrens.

77. Ablepharon absidum Harvey, Bul. Buff. S. N. S., 2, 275.
Oregon. No. 2734. Mr. Hy. Edwards.

78. Plusia Pasiphaeia Grote, Bul. Buff. S. N. S., 1, 146, pl. 4, fig. 1.
California, Mr. Hy. Edwards, No. 152.

79. Plusia bractea (S. V.), Bul. Buff. S. N. S., 2, 72.
Mr. Behrens, Mendocino, June.

80. Plusia gamma (Linn.) Can. Ent., 6, 16.
California Mr. Hy. Edwards, 147; Vancouver Island, No. 4386.

81. Plusia labrosa Grote, Proc. Acad. N. Sci., Phil., 1874, 207.
Sauzalito, Mr. Behrens, August, No. 162.

82. Plusia Hochenwarthi (Hochenw).
California, Mr. Behrens.

83. Acerra normalis Grote, Bul. Buff. S. N. S., 2, 162.
California, Mr. Behrens, No. 61.

84. Heliodoncha modicella Grote, Bul. Buff. S. N. S., 1, 116, pl. 3, fig. 12.
California, Mr. Hy. Edwards, No. 104.

85. Heliosea pictipennis Grote, Bul. Buff. S. N. S., 2, 220.
California (Mr. Crotch, Mus. Comp. Zool. Cam).

86. Adonisea pulchripennis (Grote), Proc. Bost. Soc. N. Hist., 16, 241.
California, Mr. Hy. Edwards, No. 4380.
California (Mr. Crotch, Mus. Comp. Zool. Cam.)

87. Melicleptria diminutiva Grote, Bul. Buff. S. N. S., 1, 148.
California, Oregon, Mr. Hy. Edwards, No. 204.

88. Melicleptria Californiensis Grote, Bul. Buff. S. N. S., 2, 34.
Mr. Hy. Edwards, No. 93.

89. Melicleptria prorupta Grote, Trans. Am. Ent. Soc., 4, 294.
California, Lord Walsingham (in Am. Ent. Soc.); Mr. Crotch (in Mus. Comp. Zool. Cam).

90. Heliothis phlogophagus G. & R.
California, Mr. Hy. Edwards, No. 151; Mr. Behrens.

91. Heliothis armiger (Hübn).
California, Mr. Hy. Edwards, No. 2566; Mr. Behrens, No. 54.

92. Axenus arvalis Grote, Bul. Buff. S. N. S., 1, 152, pl. 4, fig. 8.
California, No. 106; Oregon, No. 5254, Mr. Hy. Edwards.

93. Annaphila diva Grote, Bul. Buff. S. N. S., 1, 150, pl. 4, fig. 14.
California, No. 198, Mr. Hy. Edwards.

94. Annaphila depicta Grote, Bul. Buff. S. N. S., 1, 150, pl. 4, fig. 13.
California, Mr. Hy. Edwards, No. 2260.

95! Annaphila decia Grote.

Under the number 2587, Mr. Hy. Edwards sends two specimens of a smaller species than *depicta*. differing by the want of pale and brown shades on the reniform and along the t. p. line on the fore wings. The bright yellow secondaries have the black margin much wider and distinctly limited, intruded upon centrally by the yellow ground color. Beneath the fore wings have the terminal margin black as on the hind wings, not with the subterminal black fascia of *depicta*. Otherwise in markings and appearance the two species are very similar. *Expanse* 18 m. m.

96 Annaphila mera Harvey, Bul. Buff. S. N. S., 2, 277.
California, Mr. Crotch.

97. Tarache flavipennis Grote, Bul. Buff. S. N. S., 1, 153.

Sierra Nevada, Oregon, No. 2590. Mr. Hy. Edwards. The specimens are all females, and vary in the depth of color and extent of the yellow

central shading on the secondaries. Also that in one specimen the hind wings show a distinct median fascia beneath, usually indicated by a costal mark. In the pale yellow specimen this lighter shade replaces the deep yellow of the hind wings beneath. The t. p. line is marked by bluish metallic dots.

98. Trichotarache assimilis Grote.

♂. The eyes are constricted, naked. The antennæ naked. The body squamation is rough and hairy. The fore wings are narrow at base, with depressed costa, and widen terminally. In ornamentation the moth resembles *Tarache flavipennis*. The fore wings are olive blackish with gray or smoky whitish fringes, terminal space and median costal blotch which exhibits the black discal point as in *T. flavipennis*. The pale color also intrudes on costa before the s. t. line. The ordinary lines are fragmentary, marked by velvety points. Hind wings fuscous, yellow stained on the disc, with pale interlined fringes. Beneath yellow with blackish hind and external margins to the hind wings and costal stain, while on the fore wings there is a subterminal fuscous fascia, discal mark and costal stain above it; the fringes are pale. Body fuscous and mixed with pale hair. At first this insect looks like the possible male of *T. flavipennis*, but it differs apparently generically by the shaggy vestiture and narrow eyes. It differs in ornamentation by the terminal space being distinctly pale and by the want of metallic points on the t. p. line. *Expanse* 26 m. m.

California, Mr. Hy. Edwards, No. 2589.

99. Galgula hepara Guenée.

California, No. 2575, Mr. Hy. Edwards. The specimen does not seem to differ from my material from Alabama.

100. Galgula subpartita Guenée.

Sauzalito, Nov. 11th, No. 211, Mr. Behrens. The specimen is paler and more distinctly marked than Eastern specimens, but seems to belong to the same species.

101. Drasteria erechtea (Cramer.)

California, No. 1, Mr. Behrens. The specimens of this variable species agree with the typical form of the East, but are larger.

102. Drasteria cærulea Grote, Bul. Buff. S. N. S., 1, 155.

California, Mr. Behrens, No. 2; Mr. Hy. Edwards, 91. Two specimens, No. 699, are sent by Mr. Hy. Edwards, labelled "Sierra Nevada." They seem merely to differ by the absence of the parallel fascia-like dark shades to the median lines.

Litosea.

This name is proposed for the Eastern *convalescens* and a new Californian species, both differing from *Drasteria* by the male antennae being bipectinate.

103. Litosea adversa Grote.

A unicoloroous grayish species, with the thread like lines extremely inconspicuous. A black dot in the place of the orbicular. The t. p. line marked by a pale shade, nearly straight and adjacent to the similarly marked subterminal line, with which it is sub-parallel. Hind wings pale, yellowish gray, with double even lines like *convalescens*, not uneven as in the species of *Drasteria*. Beneath pale yellowish gray, powdered with ochreous, usually deeper stained outwardly. Faint discal dots and indications of double outer transverse common lines. More gray than *convalescens*, and distinguishable by the pale straight outer shaded lines of the fore wings. *Expanse* 36 m. m.

California, No. 6, Mr. Behrens (green label); Mr. Hy. Edwards, No. 708.

104. Euclidea cuspidea (Hübn.)

California, Mr. Mead, No. 38; Mr. Behrens, No. 4 (green label).

NOTES ON THE LARVA OF GRAPTA FAUNUS Edwards.

BY F. B. CAULFIELD, MONTREAL, P. Q.

On the 6th of June, 1874, I found on a wild gooseberry bush four larvæ of *Grapta faunus* Edwards. Length of full grown larva, 1¼ inch; form cylindrical; head flat in front, black, furnished with two branching horns and a few scattered white hairs; a yellow V-shaped stripe in front; the base between the horns, the ends pointing towards the mandibles; mandibles black.

Upper surface, second to sixth segments brick red, striped transversely with blue, yellow and black lines ; a few white hairs on second segment ; four branching yellow spines with black tips on third and fourth segments ; six on fifth and sixth ; seventh to twelfth segments white, with a faintly marked black dorsal strip ; each segment with three transverse yellow bands and two oblique black spots ; seven branching spines on each segment, viz., three on upper surface white, one on side brown, and one close to under surface white ; two last segments black—twelfth with seven spines, five white and two brown ; thirteenth segment with four white spines. Sides red, with two black bands, the lower band spotted with blue. Under surface grey, striped transversely with black. Feet and prolegs black.

These larvae suspended themselves to the lid of the box in which they were confined by a small button of very light pink silk, on June 18th, 1874, and in about twenty-four hours changed to grayish brown chrysalids. Head with two bi-forked horns, the outer point very short ; thorax with an elevated keel-like ridge on top, with a small tubercle on each side. At the base, below this, there is a larger tubercle, and behind it another keel-like protuberance, hollowed on top ; there are six raised silver ornaments on the dorsal surface, the first resembling in shape a capital G ; the second is an oblong spot, and the third is a sharply-pointed tubercle. The abdominal segments are furnished with eight rows of tubercles ; on each side are five brown spots, decreasing in size towards the posterior extremity, and below the spiracles there is a brown stripe. Under surface gray, with ten brown spots.

The first butterfly emerged from chrysalis on July 3rd, 1874, the second on the 4th, the third on the 6th ; the other died in chrysalis.

These larvae fed freely on wild gooseberry, but I do not think it is its favorite food, as these were the only larvae of *faunus* that I could find, although I searched closely for them. Mr. Edwards informs me that Mr. Scudder found the larva of *faunus* on Willow, and that may be its principal food plant here, for *faunus* was very plentiful here last season (1874), and if the larvae had been common on the Gooseberry I must have found them, as I examined numbers of the bushes, finding plenty of larvae of *G. progne*, but only four of *faunus*.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 35.)

LAVERNA.

Corrigenda :

The publication of the paper on this genus in the February number of this magazine, in its present form, was unfortunate, and resulted from a misunderstanding by the Editor of a letter addressed by me to him. The paper was prepared from specimens contained in Mr. Belfrage's first collection, and was sent by me to the Editor some months ago. Further study of that collection and of additional material, induced me to suppress some of the descriptions and to amend others, and with a view thereto I requested a return of that portion of the mss. Unfortunately my letter was misunderstood, and the wrong mss was returned to me, while the paper on Laverna was published. The following corrections will, I hope, prevent any confusion which might otherwise arise.

For *L. lyonetiella*, wherever it occurs in that paper, read *L. œnotheræella*. *L. lyonetiella* was the original mss name, given from its resemblance in ornamentation to some species of Lyonetia. Afterwards, on discovering the food plant, the name was changed to *L. œnotheræella* at p. 30 *ante*, but the correction was not made throughout the paper.

For *L. ignotiliella*, p. 33, read *L. ignobiliella*. The description of this species is imperfect, and was intended to be suppressed. It is not in my power now to improve it.

For *L. fuscocristatella*, p. 34. I am satisfied from further study that this description was made from damaged specimens of the species described by me in the January number as *Nœra fuscocristatella*. Naera is preoccupied among Mollusca, and I substitute for it Leuce. It is more nearly allied to Gelechia than to Laverna.

For *L. miscecalonella*, p. 34, read *miscecolorella*. The following description is at least an improvement on the former one:

Vertex and antennae brown; face and inner surface of the palpi ochreous yellow: outer surface of the palpi brown, except at the base and extreme tip, which are ochreous yellow; thorax on top and basal third of

the forewings dark brown, with some reddish ochreous intermixed, especially about the base of the hind margin, which is paler than the remainder of the basal portion of the wing: in the basal costal part of the wing are two small dark brown tufts, which, from their obscurity, are likely to escape observation: near the posterior margin of the brown basal portion are two large dark brown raised tufts, one of which is nearest the costal and the other to the dorsal margin, the *latter* being the largest. The middle third of the wing is pale ochreous, with a faint reddish tinge, and is crossed a little obliquely by three almost confluent raised tufts of the same hue, which, without very close observation, will be mistaken for a continuous transverse row of raised scales, or for two tufts, one costal, the other dorsal. In this middle portion of the wing the extreme costa is marked by numerous small dark brown spots, and the tuft is dark brown on the costal margin, and there are one or two small dark brown spots on the disc. Following this middle ochreous portion of the wing is a rather narrow and irregular band of dark brown and reddish ochreous scales, containing a large dark brown tuft on the dorsal margin, and some raised scales near the costa. Immediately behind this band is a whitish spot on the costal margin, while on the dorsal margin the brown band extends back along the margin of the dorsal ciliae to the apex, and contains a row of minute dark brown slightly raised scales, extending around the apex at the base of the ciliae, which are brownish gray. The under surface of the body is whitish, and the legs and tarsi are dark brown with white annulations. *Al. ex.* a little over half an inch.

To the naked eye the anterior and apical parts of the fore wings are brown, and the middle third stramineous.

The neuration is that of Chauliodus, except that only four, instead of five veins are given off from the cell to the hind margin, but the fifth is indistinctly indicated. The tongue is scaled (naked in Chauliodus), the second joint of the palpi is scarcely clavate and is shorter than the third, and the tufts do not project over the margins of the wings as in Chauliodus, and the somewhat elongate basal joint of the antennae has no hairs depending over the eyes as in that genus. The neuration and palpi are very nearly that of *Perimede erransella* Chamb.; perhaps they ought not to be separated generically, and, indeed, as to this species and the other Texas species in this collection, I am not sure that they should be included in Laverna, though if they are separated from it, several of the recognized European species would with equal reason be also separated from it, and more than one new genus would have to be *created.* In

truth, I am unable to determine what constitutes a true Laverna. *L. cephalanthiella* Cham. is probably nearer it than any other American species; but the species referred to this genus by European authors differ greatly in structure, more greatly, perhaps, than do those which I have referred to it. I doubt greatly whether any well marked lines separate it from Chauliodus, Chrysaelista, or even from Theisoa and Elachista.

L. obscurusella. N. sp.

The tongue is scaled as in Laverna, but the labial palpi are those of *Chauliodus chærophilellus*: the basal joint of the antennae has dependent hairs, and the tufts of scales, though not projecting over the hind margins of the wings, as in Chauliodus, are arranged along the dorsal margin. As I have but a single specimen, I have not denuded the wings.

Head and palpi white; third joint of the palpi is externally marked with about three or four small purple brown spots, and the second joint is externally dusted with scales of the same color towards the base. Antennae brown. Thorax white on top, but marked with some small brown specks, some of which also are scattered over the base of the fore wings, which are white with a large pale yellowish ochreous spot, which crosses the fold at about the basal fourth. The wing behind this spot to the tip, is more or less, though faintly tinged with pale ochreous yellow and grayish, especially so along the middle of the disc, where there are two or three small dark brown tufts of raised scales; there is a bluish gray spot on the dorsal margin before the ciliae, and there is an opposite costal spot of the same hue which also is visible in the ciliae: there are three small tufts of ochreous red scales along the dorsal margin of the fore wings, one of which is near the base, another about the middle, and the third is just behind the bluish gray patch above mentioned. The legs are brown and the tarsi are annulate with white. *Al. ex.* 3/8 inch.

Additional corrigenda:

Ante p. 30, for L. longiella read langiella.

P. 32, for superbella read elegantella.

P. 10, for buristriga read brevistrigella, and for plausipenella read planipenella.

V. 6, p. 237, pallidagrisseella read pallidegrisseella.

P. 244, for pallidastrigella, pallidestrigella.

BUCCULATRIX.

B. niveella. N. sp.

Snow white, very faintly tinged with yellowish on the front of the tuft and in the apical part of the fore wings, and with a very few scattered brown scales in the costal ciliae, but with two distinct dark brown hinder marginal lines in the dorsal ciliae, one at their base, the other beyond their middle, slightly converging towards the apex. *Al. ex.* a little under half an inch.

The two following species I place with a little doubt in this genus. In Bucculatrix the tongue is short, but with careful observation of both these species, and dissections of one of them *(B. ? magnella)*, I have been unable to discover any trace of a tongue ; the tuft also is larger than is usual in Bucculatrix, and in the hind wings of *B. magnella* the apical vein goes *to* the apex, and the median gives off only a single branch, instead of two. It is also a large species for the genus.

B. magnella. N. sp.

Snow white. There is a rust red spot on the front of the tuft ; a dark golden brown streak along the middle of the fore wings, beginning on the base, but in the apical part of the wing curving down to the base of the dorsal ciliae, and extending thence around the apex. There is another narrow streak of the same hue parallel to it, which begins behind the middle of the wing, and is usually partly confluent with it, and after reaching the base of the dorsal ciliae, it passes on to and through the apical ciliae. There is a dusting of ochreous scales along the base of the costal ciliae, and the apex is suffused with reddish ochreous. *Al. ex.* fully half inch. Season, April and May.

B. immaculatella. N. sp.

No tongue? Silvery white, immaculate. *Al. ex.* $\frac{7}{16}$ inch. Season, May.

BUTALIS.

B. brevistrigella.

This is a very variable species, or my specimens represent more than one species. Sometimes (as stated in the former description) there is simply a yellow streak on the fold, which is sometimes interrupted. In others there is no distinct streak on the fold, but the dorsal margin to the fold, and crossing it near the base of the wing, is densely dusted with pale ochreous yellow, thus approaching *B. dorsipalidella*, which may possibly be an extreme variety of the same species.

ERIPHIA *gen. nov.*

Allied to Elachista and Laverna. Indeed, but for the more elongate palpi, and without having examined the neuration, I should have placed it in Elachista.

Palpi rather long, drooping in the dead insect, divergent; third joint pointed and about half as long as the second. Antennae simple, about as long as the body.

Primaries lanceolate; the submedian is furcate at the base; the cell is truncate (the subcostal and median running nearly parallel, and the discal vein being straight); the subcostal gives off three branches before the end of the cell, and a fourth at the end has a common origin with the fifth or apical branch, which goes to the apex; the discal has a central branch to the dorsal margin, and the median is furcate from the end of the cell, both branches being short. It thus resembles *L. astra* or *L. longiella*, Ins. Brit.

Secondaries linear lanceolate. Internal and submedian veins distinct, the latter furcate on the dorsal margin; median obsolete to the end of the cell, where it divides into two distinct branches; discal short, distinct, closing the cell about the middle of the wing; subcostal indistinct to the end of the cell, where it becomes distinct and bends up to the costa just beyond the middle. (Possibly, however, it would be more correct to consider what I have called the 'internal' as the submedian, and what I have called 'submedian' as the median; and what I have called the 'median' as a furcate branch of the discal continued faintly through the cell to the base. If this view is correct, then the cell is unclosed between the submedian and the furcate discal branch, and thus the neuration of both wings would *resemble* those of *L. longiella*, and the insect would be a Laverna.

E. concolorella. N. sp.

Dark bronzy brown; unicolorous. *Al. ex.* ⅓ inch. Season, July.

ELACHISTA.

E. ? concolorella. N. sp.

Without the aid of a lens, this insect would be mistaken for the preceding. It is, however, quite distinct. The antennae are but little more than half as long as the wings, and the palpi are not much more

than half as long as in *Eriphia concolorella*. I place it somewhat doubtfully in Elachista, because of the neuration, which approaches that of Laverna. The submedian of the primaries is not furcate at the base; the cell is narrow and acuminate, with three subcostal branches to the margin from near the end of the cell, besides the apical branch, which is furcate before the apex, with one of its branches to each margin; the median is also three-branched, the last from the end of the cell almost confluent with the furcate apical branch of the subcostal.

In the secondaries the cell is rather wide, unclosed; the subcostal is distinct and furcate, with a branch to each margin; the median is three-branched (or two-branched, with an independent discal branch arising *at* the median and indistinctly continued through the cell, which is unclosed).

Dark bronzy brown; unicolorous. *Al. ex.* a little less than a third of an inch. Not so slender an insect as *Eriphia concolorella*.

E. parvipulvella. N. sp.

White; a few ochreous yellow scales scattered over the primaries, especially towards the apex. *Al. ex.* scarcely ¼ inch. Season, May, July, August and September.

CORRESPONDENCE.

YOUNG OF POLYXENUS.

DEAR SIR,—

During the past summer I have bred the young Polyxenus from the egg. The eggs were found under the bark of dead pines, and were in masses of about thirty, I should judge; intermixed with them were numerous hairs from the posterior part of the body of the adult. The eggs are translucent white, sometime before the young appear turning somewhat opaque; in shape oval, long diameter barely one-hundredth of an inch.

Length of the young ten hours from the egg, seven two-hundredths of an inch. The young differ in no marked manner from the adult, except in the smaller number of segments, which are four, and in having only three pairs of legs, attached to the three anterior segments. The fourth segment is small and has the two tufts of silvery hair so characteristic of the adult.

HENRY L. MOODY, Malden, Mass.

CROCIGRAPHA.

DEAR SIR,—

On page 250 of the CAN. ENT., Mr. Morrison doubts the propriety of the generic reference of *Perigrapha Normani* Grote. I had previously (Bull. B. S. N. S.) noted the different antennal structure of the American species, not being acquainted autoptically with the European forms. The species of *Perigrapha* are regarded as related to *Taeniocampa* by Lederer, and it was natural that in describing an American species, differing by the presence of a prothoracic tuft, that I should refer it to a genus differing by this character from *Taeniocampa*, to which otherwise both were related. Lederer has divided the genus *Taeniocampa* (which should now be known, as I have shown elsewhere, as *Graphiphora*) into sections already, on peculiarities of antennal structure. There can be no propriety of further enlarging the genus by the admission of species with a tufted thorax, so that I propose the above name for *C. Normani*.

DEAR SIR,—

In Mr. Morrison's letter on page 16 of this volume of the CANADIAN ENTOMOLOGIST, he allows himself to call my statements with regard to certain recently described species, "palpable blunders." In the course of his paper, however, the synonyms I claimed that Mr. Morrison has made are admitted, with the exception of two, *Hadena rasilis* and *Agrotis exsertistigma*. With regard to the former insect, I think it much more nearly resembles Hübner's figure of *grata* than *Graphiphora oviduca* does in habitus, size, ornamentation and color, and my blunder (if I had made one) can hardly be called "palpable." With reference to *Agrotis exsertistigma*, I find that I am in error and that the species is valid. I have not known until now the true *exsertistigma*. Mr. Morrison founded this species on two specimens sent him by myself for description with other material, but neither were returned me with the other specimens. Having no duplicates of the material sent him, I inferred that *exsertistigma* was based on specimens with open orbicular, which I referred to *alternata*, but which I now see are Californian specimens of *A. cupida* Grote. Mr. Morrison's non-return of the specimens merely confirmed me in my own wrong identification of *alternata* Grote, as found in California. I am exceedingly sorry to find myself in double error. In the present case the description of Mr. Morrison has helped to mislead me, since *exsertistigma* has a conical abdomen and should not be compared with either *alternata*

or *cupida*, which have it flattened, while *cupida* varies in California in a character (the open orbicular) which Mr. Morrison uses to separate *exsertistigma*.

To the list of synonyms I have given as recently made by Mr. Morrison, Mr. Morrison adds that of *Orthosia baliola*. They would therefore stand as follows:

1. *Copipanolis vernalis* Morr. = *Eutolype Rolandi*.
2. *Mamestra illabefacta* Morr. = *Mamestra lilacina*.
3. *Anthoptera nigrocaput* Morr. = *X. Ridingsii*.
4. *Orthosia baliola* Morr. = *Apamea purpuripennis*.
5. *Hadena rasilis* Morr. = *Elaphria grata*.

Of these five synonyms, one (No. 4) I had not detected, one (No. 5) is not conceded by Mr. Morrison and three (Nos. 1–3) are now admitted by him.

Mr. Morrison is in error in stating that I remark that his *vulgivaga* is "probably a re-description of *H. apamiformis*." I quote the species on page 215 as a distinct species unknown to me, and merely say "from the description I think it not improbable," etc., which is a very different thing. I make no positive statement with regard to either *sericea* or *vulgivaga*. I am glad that *sericea* is not founded on the specimen sent me as a "n. s." allied to *apiata*, because that *was apiata*. I thought *sericea* might be the insect, because Mr. Morrison disputed my determination and thought it distinct, and because he speaks comparatively of *apiata* in his description of *sericea*.

In CAN. ENT., 6, 250, Mr. Morrison states that "Mr. Grote refers *Ceramica* to *Taeniocampa*." In my paper (Bul. Buff. S. N. S., 2, 122) I give the genera (as elsewhere) separately and distinctly, but cite their names under the same heading in a short synoptical table, with the remark, "I have no perfectly preserved specimens of *Ceramica exusta*, and the structural difference from *Taeniocampa* is not apparent to me," as an excuse for so doing.

Mr. Morrison's remark as to my identification of *Agrotis lycarum* I think is unfairly put. This identification was always made hesitatingly from a figure, and had been finally abandoned before Mr. Morrison had written on the subject. Again, *repentis* G. & R. was described in Europe and the name a ms. one of Guenée's. That we had not then identified *messoria* was, perhaps, pardonable, Mr. Riley also having redescribed Harris' species as *Cochrani*.

I notice, also, Mr. Morrison's remark that I have mistaken the generic characters of *Hydroecia semiaperta*. This species, with hairy eyes, is placed by Mr. Morrison first in *Hydroecia*, a genus which has the eyes *naked*. It was sent to me as a n. s. of *Hydroecia* by Mr. Morrison for examination, and I then returned the species determined as belonging to a genus allied to, but distinct from *Hydroecia*. In the Proceedings of the Academy I merely discuss the priority of the names *Apamea* and *Hydroecia*, show that they are synonyms, and adopt *Apamea* and refer *all* the American species described under *Hydroecia* to *Apamea*. Among them is Mr. Morrison's *semiaperta*. There is not a word as to the structure of the species, and, in fact, I refer to *semiaperta* in the next description as *Hydroecia semiaperta*. It was not my intention then to discuss its structure or erect the new genus, to which I have always in letters stated it to belong.

Mr. Morrison speaks of *nigrescens* as a synonym of *fasciolaris*. I have examined and determined both species as distinct from specimens in the collection of the American Entomological Society. The two are totally, and, I believe, even generically different.

Mr. Morrison allows himself to make an extraordinary statement with regard to one of the few generic names proposed in my List and its Supplement, to the effect that such names without further description need not be adopted. Independent of the fact that it is customary to retain such names as can be proven by the works of Hübner, Ochsenheimer, Walker and many others, the view taken by Mr. Morrison is untenable from the consideration that I have indicated my type and clearly circumscribed the genus by an enumeration of the species in every case. Science is occupied by the fact and not the name; by his criticism Mr. Morrison shows himself affected by the name and not the fact. There can be no doubt that I have made such genera recognizable by including under them described species and thus facts and things admitted by science as existing and already defined. My generic names are as strictly to be preserved in these cases as if they were defined with the minuteness which characterizes Mr. Scudder's definition of *Papilio*. Take, for instance, my genus *Eucoptocnemis*, proposed in my List for the *Heliophobus fimbriaris* of Guenée. Even the Etymology of the name suggests my reference to Guenée's statement that his species has armed tibiæ, and my inference that then it cannot be a *Heliophobus*, which has them unarmed. If from such data as this no conclusion can be drawn and no action taken by a

student in my capacity, then large numbers of terms throughout Zoology are liable to be overturned any moment by persons as ill-advised as Mr. Morrison. I cite, for example, Mr. Allen's recently described *Loligo Hartingii*, determined specifically upon a figure.

It is true that Mr. Morrison takes no regard as to the meaning of generic terms, and hence has probably taken no cognizance of the derivation of *Eucoptocnemis*, since he establishes himself a new genus under the name *Eutricopis* (my term *Tricopis* with a common prefix), which belies its designation in having the tibiæ unarmed! Mr. Morrison incorrectly refers *Eucoptocnemis fimbriaris* to my genus *Pleonectopoda*, where it does not belong, just as he incorrectly refers *Eutolype Rolandi* Grote, under the synonym *vernalis*, to my genus *Copipanolis*, where it is equally out of place.

My List of the Noctuidæ will amply attain the ends proposed if it will continue to call forth corrections and additions, and so be of service in perfecting a knowledge of its subject, the Noctuidæ of N. America.

A. R. Grote.

Buffalo, N. Y.

Dear Sir,—

I got a number of larvae of *Papilio asterias* in July, 1874, in Fulton County, Ohio, three of which changed to pupae. One of the pupae I poured chloroform over, and when it stopped moving, put a pin through it. A few days after I looked at it, and found it had grown almost black about the wing cases. I broke off the piece of the pupa skin that covers the head, legs and antennae, and was surprised to see it move. The wings would get dry sometimes, and I would put a drop of water on them to keep them moist. At last the time came for hatching, and with my help, the butterfly got out of the pupa case, but could not expand on account of its wings being dry. Yours truly,

Allen V. Moore.

Fort Buford, D. T.

The Canadian Entomologist.

VOL. VII. LONDON, ONT., APRIL, 1875. No. 4

SUGARING FOR NOCTUÆ.

BY GEO. NORMAN, ST. CATHARINES, ONT.

Having been requested by the worthy Editor of this journal to contribute a few hints on sugaring for Noctuæ, I have endeavored to put together a few notes that may prove serviceable to those who may not have been successful in this method of capture. To begin with, it ought to be a golden rule never to abandon a locality, even should it yield nothing for a few nights. Often have I sugared a new locality night after night, with absolutely no results, but by persevering the moths have become attracted to the place, and, in course of time, were swarming on every tree.

The mixture I have found to answer best is either the common black treacle (not refined syrup), or the very coarsest brown sugar, called, I believe, by the trade, "Jamaica foots." In either case, the sugar or treacle must be thinned down to a proper consistency by means of stale ale, or, what is still better, the thick yeasty residuum from an ale or stout cask. Some collectors add a drop or two of oil of aniseed, and just before brushing on to the trees, a small quantity of rum, but I have really found no benefit from either addition. My receptacle for the mixture is made of zinc, flattened at the sides and rounded at the corners, so as easily to slip into my shooting-coat pocket. It has a brass screw at the neck, with a leather washer, the handle being attached to the brush—an ordinary painter's "sash tool,"—and goes inside the neck and is screwed tight when in the pocket. By this means all soiling the fingers is avoided.

On arriving at my ground, I look for a round with plenty of young trees with stems under twelve inches in diameter, selecting a place interspersed, if possible, by walks and footpaths. The thick, dense portions of woods are of no use, but the outside trees will do very well, provided the trees are not too large and the trunks too rough and corky; choose the trees

of medium roughness, for perfectly smooth ones, such as beech and young poplars, are as bad as those too rough, and rarely pay for the trouble. Spread the mixture on the leeward side of the tree, in a longish patch, at about the heighth of your face from the ground, as near sun set as possible as to time. Then comes a quiet pipe or two until it is dark enough to light the lantern. Never smoke when examining for moths, or you will lose many a rarity. When quite dark, light the lamp and go carefully over the trees.

My lantern is a portable flat one, burning the vapor of benzoline, and is, I believe, called a "sponge spirit lamp." It is far more cleanly than oil. The lantern has a drawer for matches, and instead of having a "bull's eye" in front, has a circular piece of plate glass, with bevelled edges. This arrangement allows the light to spread more than the "bull's eye," and enables one more easily to take the moth with the net, should it try to escape. No one ought to rely upon his chip boxes or cyanide bottle alone, when he goes his round; some moths are proverbially skittish, or fall to the ground and are lost among the herbage, if a hand net is not placed beneath them. The old plan of using a chip box for each specimen is, I think, the best, but many prefer the cyanide bottle. If the moths are left for twelve hours in the bottle they lose much of their rigidity.

In barren places, without trees, the sugar may be applied to stones and rocks, and on the sea shore or on sand hills, pieces of chip or wood may be sugared and stuck in the ground; or, in the event of these being not procurable, heads of thistles or bents *(Ammophila)* may be tied into bundles and smeared with the enticing lure; such localities often yield rare *Agroti*. I have generally found damp, dark nights, with a soft breeze blowing, the best, but have also had most excellent collecting even during the most brilliant moonshine. Some writers recommend sugaring a tree every ten yards or so; my plan has been to sugar every suitable and accessible tree, however near each other. In the spring the catkins of willows and sallows ought to be visited and carefully examined by means of a bull's-eye lantern. Many hybernated moths will be found in company with the Tæniocampidæ. Again, in the autumn the flower spikes of the common reed *(Arundo phragmites)* should be visited after nightfall. In my excursions I usually carry my apparatus, lamp, &c., in a leathern wallet, which is suspended by rings to a stout leather waist belt. This arrangement leaves the shoulders and chest free.

HINTS ON COLLECTING COCOONS OF THE LUNA MOTH—*Tropæa luna.*

BY ROBERT BUNKER.

Many Entomologists are under the impression that the cocoons of this species and *polyphemus* are exactly alike in appearance. This is a mistake; and the collector who has been misled by writers on the subject and has got together by careful searching a dozen cocoons, expecting at least to get a small share of *lunas* from them, is greatly disappointed when they change to find them all *polyphemus.*

Having had some experience in collecting cocoons of both species, I will endeavor to point out the differences. The *polyphemus* cocoons are white, or dirty white, 1.25 to 1.75 in. long (those producing females the largest), with rounded ends; sometimes angular, caused by leaves being moulded unevenly to the surface; generally coated with white powder; firm in texture, and producing silk of a coarse quality.

The *luna* cocoons are chestnut brown, a little larger than *polyphemus;* egg shaped; very thin, and frequently rough on the surface, covered with warts and excrescences; they seldom show the print of leaves on their surface.

From my own observations, I am strongly inclined to the opinion that the larva of this fair queen of the night seldom spins its cocoon between leaves in the tree, but crawls to the ground and fastens it to any object that comes in its way. This belief has been strengthened by frequently finding cocoons with grass moulded to their surface; furthermore, last fall I found a cocoon firmly attached to a tuft of grass six or eight inches from the ground, and another fastened to a twig or sucker about the same distance from the ground; add to the above the fact that cocoons are almost always found on the ground near the trunk of the tree, and we have a pretty clear case that the habits of this elegant species are quite different from those of *polyphemus.*

Hickory, Beech and Oak are the food plants of this species; *polyphemus* has a much wider range, and is, consequently, far more numerous. In collecting I find about six of the latter to one of the former.

Spring is the best time to search for cocoons, as most of the leaves blow away during the winter, leaving the cocoons exposed to view; it is best, however, to look for them both in fall and spring.

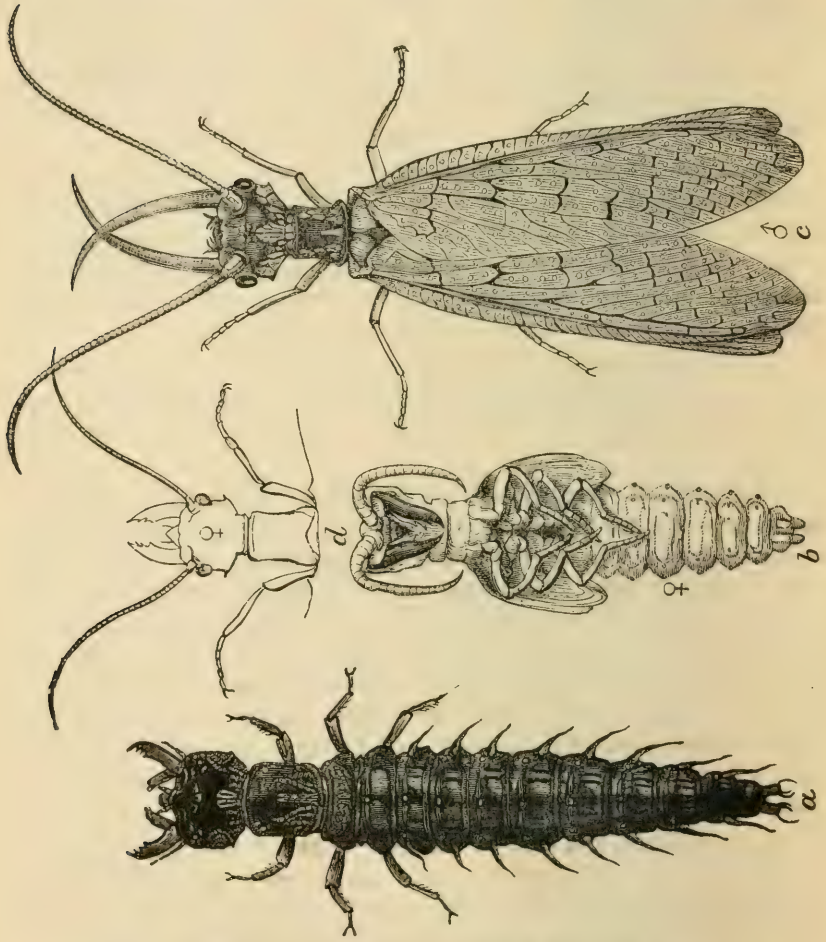
ON SOME OF OUR COMMON INSECTS.

THE HELLGRAMMITE FLY—Corydalis cornutus Linn.

BY THE EDITOR.

This insect is common throughout Ontario, and wherever found, either in its larval or perfect state, excites astonishment and curiosity, owing to its immense size and formidable appearance ; it is not, however, in any way poisonous, as some imagine. In fig. 9 this insect is represented in

Fig. 9.



Colors—(*a*) dark brown, (*b*) whitish, (*c*) and (*d*) light brown.

its several stages, while in fig. 10 the perfect female is shown with wings expanded. The larva, which is a diabolical looking creature, is seen at *a*, fig 9 ; it spends the earlier portion of its life in the water, crawling and swimming about upon the bottoms of rivers and streams, feeding upon

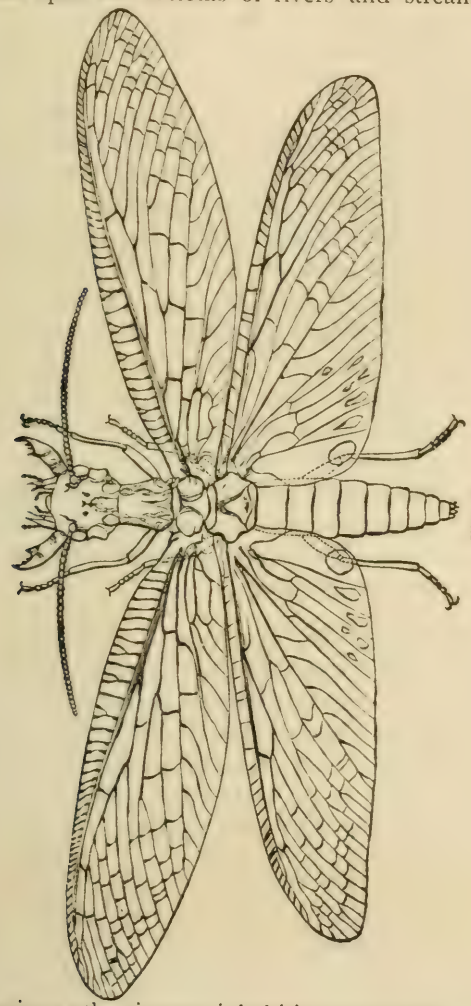


Fig. 10.

the larvae of various other insects inhabiting the water. Mr. Riley has published an excellent paper on this insect in the first volume of the *American Entomologist*, from which most of the remarks following are condensed.

Most aquatic larvae spend the period of their chrysalis state in the water, and only emerge therefrom when ready to pass into the perfect or winged state; but the insects forming the group to which this larva belongs, leave the water while they are still in the larval state, and do not usually become pupae for several days or even weeks thereafter. Hence the Creator, to meet their necessities, has given them a double system of respiration—a set of gills to breathe with in the water, and a set of breathing holes, or spiracles, to breathe with upon land. In this larva the gills assume the form of paddle-like appendages, and are placed one pair upon each of the seven front segments of the abdomen, while the spiracles are arranged in the usual manner along the sides of the body. After leaving the water the larva crawls rapidly about, chiefly in the night time, in search of a safe and suitable place in which to spend the chrysalis stage of its existence, usually selecting the under surface of a flat board or log, or burrowing under some large stone. Before attaining its object, it sometimes wanders as much as a hundred feet from the water's edge, and an instance is given of one which crawled up the wall to the roof of a one-story building, and then tumbled accidentally down the chimney, to the great dismay of the good woman of the house. At this stage of their existence they are sometimes used by fishermen for bait, and having a very tough skin, one larva often suffices to catch several fish. They can pinch pretty sharply with their strong jaws, and they use the processes at their tail to assist them in climbing.

After a suitable hiding place has been selected, the larva forms a rude cell in the earth, and here changes to an inactive chrysalis (see fig. 9, *b.*) In this figure the wing cases are slightly spread apart from the body to show their shape and structure, whereas in nature they are closely appressed to the sides of the body. The larva leaves the water usually about the beginning of June, and by the end of that month, or the beginning of July, the perfect insect bursts its bonds and appears in the winged state.

In this form it measures, when its wings are spread, from four and a half to five inches; these, as shown in the figure, are gauze-like and covered with an intricate network of veins. The forewings are streaked with dark brown and sprinkled with whitish dots, of which latter there are also a few on the hind wings. The male (fig. 9, *c*) is remarkable for its enormous jaws, which are very long and hook-like, while the female (fig. 9, *d* and fig. 10) has short jaws. The flies hide themselves in obscure holes and corners during the day, and become active as the shades

of evening gather. They frequently fly into houses situated near running water, soon after dusk, attracted probably by the light.

The eggs of the Hellgramite Fly are oval, about the size of a radish seed, and of a pale color, with some dark markings. They are usually deposited in patches, upon reeds or other aquatic plants overhanging the water, where, when hatched, the young larva may find ready access to that element which is destined to be its home until the end of the following spring.

PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part V.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

105. Agrotis vittifrons Grote, Proc. Ent. Soc. Phil., 3, 527, pl. 5, fig. 6.

Nevada, Mr. Hy. Edwards, No. 5645, one ♀ specimen. I think I may have mistaken the sex of my original type, and that it is a male. The present specimen seems to differ by the costal band and collar being leathern brown, the orbicular tolerably distinct, and the cell suffused with blackish. The hind wings are blackish fuscous.

106. Agrotis silens. N. sp.

♂. The antennæ are brush-like. Fore wings hoary over fuscous, with the costal region and stigmata gray. A black basal dash and black shading on the cell between the ordinary spots, which are moderately sized, sub-equal, the orbicular incomplete superiorly. Ordinary lines obsolete. The t. p. line indicated by geminate marks on costa above the reniform, and elsewhere feebly noticeable. Veins indistinctly darker marked. The black cell shading less distinctly continued to s. t. line between veins 4 and 5. Subterminal line indistinct, gray, preceded by more or less distinct black interspaceal marks. Apical shade gray; terminal space darker, fuscous. Terminal line black, fringes pale fuscous tipped with a faintly brown basal shade, and improminently interlined with

pale. Hind wings whitish, smoky about the margin, with white fringes. Thorax and head like fore wings, Collar with a black line. Front with two short black lines. Lower portion and tips of palpi pale. Abdomen griseous, with a stigmatal black line. *Exp.* 35 m. m.

This species is stouter than *rudens*, of a rougher appearance, and it differs by the more deeply stained hind wings, the open orbicular and the general color. The fore tibiæ are wanting in the specimen.

Nevada, Mr. Hy. Edwards, No. 5603.

107. Agrotis excellens Grote, Proc. Am. Ent. Soc. (1875).

Vancouver's Island, Mr. Hy. Edwards, No. 5570.

108. Agrotis intrita Morrison, Proc. Bost. S. N. H., 1874, 164.

♂. Antennae coarsely brush-like. All the tibiae spinose. Rich deep brown, with an olive ochre stain, which tinges the thorax and the markings of the fore wings. Thorax and head concolorous with fore wings. These latter are of so intense and even a color that the markings are obscured. The ordinary lines are deep blackish, geminate, with paler fillings. Orbicular round, the black annulate with a pale interior lining. Claviform rather large and pointed. Reniform moderate, with an indistinct interior annulus, the stigmata well separated and without discal suffusion. T. p. line lunulate, even in its general course, not inwardly bent below the median vein. Subterminal line indistinct, pale, of the usual irregular shape, continuous. The dark fringes are interlined with pale. Hind wings and fringes unicolorous, light fuscous, without marks. Abdomen like hind wings, with ruddy lateral and inferior tinting. Beneath the wings are without lines, clouded, subirrorate, hind wings with an obsolete point and largely pale inferiorly. *Exp.* 30 to 32 m. m.

Mr. Hy. Edwards, Nos, 5646, 5640, 5607, Vancouver Island.

Mr. Morrison has identified a specimen without which I could not have known his species, since he compares it briefly with *phyllophora*, to which it bears no near resemblance.

109. Agrotis pastoralis. N. sp.

♀. Antennae simple; all the tibiae spinose. Wings elongate. Thorax and fore wings dull black. All the markings faint. Orbicular small, spherical, interlined with pale powdery scales. Reniform of the usual shape, well removed from the orbicular, more prominently interlined with

pale powdery scales than the orbicular. Lines obsolete. Hind wings wide, blackish fuscous, without marks. Fringes white outwardly. Beneath paler, irrorate, with shaded faint common band and discal marks. *Exp.* 42 m. m.

Vancouver Island, Mr. Hy. Edwards, No. 5638.

This is a large species, differing decidedly from *velleripennis*.

A specimen sent by Mr. Theo. L. Mead, collected in Colorado, differs by the general tone being more fuscous, less blackish, with the t. p. line faintly legible. I think it is the same. Mr. Mead's number is 51.

Agrotis gagates. N. sp.

♀. A single specimen collected by Mr. Mead, in Colorado, and sent to me under the number 56, is closely allied to *pastoralis*, but differs by the color of the fore wings and thorax being of an intense red brown, very much like that of *Hadena lateritia (dubitans* Walk). The abdomen is red tinted beneath. The subterminal line is pale, distinct, powdery, continued, of the usual irregular shape. There is no trace of it in *pastoralis*. *Expanse* 43 m. m.

In this Coloradian species the t. p. line is visible through a lighter succeeding tinting; it is not bent down below the cell, and is slightly and regularly lunulate.

110. Bolina hadeniformis Behr. Trans. Am. Ent. Soc., 3, 25.

Downieville (Behr.) Unknown to me. Dr. Behr also describes specimens doubtfully under the names *jucunda* and *cinis*.

111. Syneda Edwardsii Behr, Trans. Am. Ent. Soc., 3, 28.

California, Mr. Hy. Edwards, No. 89. Two specimens.

112. Syneda ochracea Behr, Trans. Am. Ent. Soc., 3, 25.

California, Mr. Hy. Edwards, No. 1267.

113. Syneda socia Behr, Trans. Am. Ent. Soc., 3, 27.

California, Mr. Hy. Edwards, No. 52. One specimen from Santa Barbara.

114. Syneda Howlandii Grote, Proc. Ent. Soc. Phil., 3, 533, pl. 6, fig. 7.

Mr. Edwards sends me a specimen of *Syneda Stretchii* Behr, from Nevada, which will, I think, prove identical with my previously described Coloradian species.

115. Syneda divergens Behr, Trans. Am. Ent. Soc., 3, 27.

Sierra Nevada, Mr. Hy. Edwards, No. 4307.

116. Syneda adumbrata Behr, Trans. Am. Ent. Soc., 3, 27.

Sierra Nevada, Mr. Hy. Edwards, No. 2262.

I do not think that either of these two latter species is the same as our Eastern *graphica*. *Divergens* is nearer to *hudsonica*. If the differences which separate these Californian forms are really of specific value, it may eventuate that the specimen figured as the ♀ *hudsonica* is a distinct species. Having only single specimens of the Californian species, and without my types of *hudsonica*, I cannot attempt to offer any conclusions.

117. Syneda Tejonica Behr, Trans. Am. Ent. Soc., 3, 26.

Fort Tejon (Behr.) Unknown to me.

118. Syneda nubicola Behr, Trans. Am. Ent. Soc., 3, 25.

Tuolumne River (Hoffman.) Unknown to me.

119. Syneda maculosa Behr, Trans. Am. Ent. Soc., 3, 26.

Tuolumne River (Behr.) Unknown to me. These two species may belong to a different genus.

120. Lita sexsignata Harvey, Bul. Buff. S. N. S., 2.

Nevada, Mr. Hy. Edwards, No. 5536; California, Mr. Crotch in Mus. Comp. Zoology, Cambridge.

Behrensia. N.g.

Allied to *Plusia*. The head is sunken; eyes naked, lashed; labial palpi with obtuse terminal article, second joint loosely haired. Maxillae stout. Collar produced in front so as to stand off from the prothorax. Thorax tufted behind, but apparently without the large dorsal tuft of *Plusia*. Abdomen with a fan-shaped mesial tuft, which is concave on the face, directed towards the abdominal tip; sides tufted; body pilose. Antennae pubescent, simple. Ornamentation resembling *Abrostola*.

121. Behrensia conchiformis. N. s.

♂. Thorax and fore wings blackish gray. Median lines deep black, distinct, sinuous, geminate; a fine line precedes the t. a. and succeeds the t. p. line. T. a line with a costal tooth, rather deeply undulate. Median space much shaded with black, obscuring the rounded claviform. Orbicular large, round, whitish, with dark centre. A white shade obtains between the spots, extending below the median vein, and touches the large reniform, which has a dark central streak touched with green. Green and slightly orange scales are scattered along the subcostal vein, along the obsolete basal half line, beyond the t. p. line, and the scalloped terminal line is green, of the light hue of copperas. Subterminal line faint, pale. Hind wings pale in the disc, the pale portion neatly defined by a mesial black streak. Beneath the mesial black line is distinct and denticulate, and the white disc shows a black streak less noticeable above. A second, sub-basal line is costally visible. Fore wings show a black curved extra mesial line, else both wings are blackish gray. The body hairs beneath are tinged with reddish, as in some species of *Plusia*. *Expanse* 29 m. m.

Mr. Behrens, No. 226, California (Sauzalito).

The handsome species appears to me to differ generically from any of the forms included by Lederer in *Plusia*, by the obtuse, dependent third article of the loosely held, hanging palpi. The collar is unusually projected, without being broad. The head is more sunken than in any species of *Plusia* known to me. The base of the antennae are shielded by long hair tufts.

122. Graphiphora Behrensiana. N. s.

The eyes are hairy. The fore wings are coarsely irrorate with black, of a dull brown ground color, darker to the pale subterminal line, beyond which they are paler, with the veins pale marked. The costal edge is carneous. The lines are pale, tolerably approximate on internal margin, rather even, with blackish margins, the t. a. line outwardly oblique, the t. p. line flexuous. Ordinary spots large, pale margined, fused, so that there is a resemblance to some species of *Glaea*. Hind wings soiled white, sparsely irrorate, with a discal dot, concolorous fringes and a broken terminal line. Beneath whitish, a continuous line on primaries, dotted on the hind wings; discal marks double on fore wings; very distinct on secondaries. *Expanse* 35 m. m.

Mr. Behrens, Sauzalito, No. 227.

ERRATA.—Page 27, for "*illaudibilis*" read "*illaudabilis.*" Page 28, dele "*atlantica, subjuncta,*" and insert "*mactata.*"

PARASITIC DIPTERA.

By the kindness of Baron Osten-Sacken, of Cambridge, Mass., we have been favored with the following notes :

Gaurax anchora Loew., Centur., vii, 94.

Numerous specimens of this insect have been bred by Baron Osten-Sacken from a cocoon of *S. cecropia.*

Blepharopeza adusta Loew., Cent., x, 67.

Examples of this species have been reared from the caterpillars of *Spilosoma acrea* by Mr. H. Edwards.

LOCAL LISTS OF BUTTERFLIES.

All our American readers who are collecting Diurnal Lepidoptera, in whatever part of the country they may reside, would confer a great favor on us by sending lists of the names of such species as are found in their neighborhoods, stating at the same time whether the species are abundant or otherwise. If a general response can be obtained to this request, we shall be able to present our readers with a tabulated list, showing more correctly and completely than has heretofore been known, the distribution of the various species of butterflies throughout America. Such information is very desirable, and would save those at present engaged in the study of this interesting family, as well as any who may hereafter enter on it, an immense amount of correspondence. Mr. W. H. Edwards, of Coalburgh, W. Va., has kindly undertaken to tabulate all the lists that may be sent in, and when completed, publish the material in our pages. We hope our friends will all aid in this desirable undertaking, and each contribute his mite, sending the lists as complete as possible. Lists will be acknowledged in the ENTOMOLOGIST in the order in which they are received.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 56.)

DRYOPE.

D. luteopulvella. N. sp.

Pale yellow, sprinkled with pale fuscous. *Al. ex.* $\frac{7}{16}$ inch.

I have also taken it in Kentucky, and have received it from Miss Murtfeldt from St. Louis.

AETOLE, *gen. nov.*

Belongs to the Elachistidæ, but is quite distinct from any genus known to me, approaching perhaps as near to Heliozella as to any other.

Tongue long and naked; no maxillary palpi; labial palpi *very* short, drooping, the third joint pointed, about as long as the second; forehead wide, obtuse; face wide but little retreating; scales of the head appressed. Eyes moderate, scarcely visible in front; antennae about as long as the body, simple, rather thick, the basal joint short.

Primaries lanceolate, scarcely caudate, but with the apical part narrow and pointed; cell closed by a somewhat oblique discal nervure; the subcostal gives off two branches before the end of the cell, and attains the margin before the apex; the discal gives off two branches, the superior being furcate before the apex, with one of the branches to each margin; the median is furcate from the end of the cell, and the submedian not furcate at the base.

Secondaries narrowly lanceolate; costal vein very short; median distinct; cell unclosed; subcostal obsolete to the middle of the wing, thence furcate with one branch to the apex and the other to the dorsal margin, and there is an independent discal? branch to the dorsal margin.

A. bella. N. sp.

Head, thorax, base of primaries, with a short basal streak near the margin, and the antennae, are dark slate brown, iridescent or silvery according to the light. Primaries reddish orange, with the base and basal streak, on the fold, a spot before the middle of the dorsal margin, another

a little further back near the costal margin, another on the dorsal margin about the middle, and a small costal one opposite to it, and a wide band around the apex of the ciliae, of the same iridescent brown with the head and thorax. Ciliae dark brown, of a different hue from the band at their base; this band and the costal and dorsal spots are margined by some deep maroon brown scales. Sides and under surface of the thorax reddish orange. Abdomen and legs of the same hue with the head and wing spots, and the metathoracic legs have a reddish orange patch on the anterior surface of the tibiae. *Al. ex.* ¼ inch. Season, August. A very pretty little species.

Perhaps I am wrong in placing Aetole among the Elachistidæ, as I am not certain that it does not more properly belong with Tinagma, Perittia, Douglasia, &c., which Mr. Stainton, in Ins. Brit., v. 3, has placed in the family Glyphipterygidæ. But neither in the brief accounts there given, nor in the figures can I discover any reason for separating these genera from Elachistidæ; nor, from the formation of such a heterogenous group as Mr. Stainton's Glyphipterygidæ seems to me to be, Acrolepia, Roslerstammia, Glyphipteryx and even Aechmia seem to me to belong as properly in Gelechidæ as Butalis does, and more properly than do either Pleurota or Harpella. On the other hand, Douglasia, Perittia and Tinagma might be placed in Elachistidæ with perhaps as much propriety as Heliodines, Bedellia, Chrysoclista or Asychna. As to some of these genera, as Tinagma, Perittia, Antispila, &c., it seems to me there is much force in the suggestion of Dr. Clemens in one of his letters, published by Mr. Stainton in his edition of the Clemens' Papers, to separate them from Glyphipterygidæ, and form, by their combination with some genera now included in Lyonetidæ, a new and more homogenous genus. As before hinted, Lyonetidæ does not seem to me to be a much more homogenous group than the Glyphipterygidæ.

But I do not pretend to criticise the work of much better Micro-Lepidopterists than I ever expect to be. These are simply my reflections on reading some of the writings of Mr. Stainton and Dr. Clemens, the only authorities within my reach. *Glyphipteryx impigritella* Clem., two, or at most, three species of Lyonetia, a few of Antispila and Butalis, are the only genera above named which are known to be represented in this country; and for the other genera above named I have no authority to consult but Mr. Stainton. *Aetole bella* resembles closely the European *Chrysoclista lineella.*

GRACILARIA.

G. (Coriscum) quinquistrigella. N. sp.

Head, face and palpi white, except the outer surface of the tuft and an annulus about the middle of the third joint at its tip, which are grey brown. Primaries grey brown, margined all around by white, widely so on the dorsal margin, but confined to the extreme costa on the costal side, and about five short, oblique, white costal streaks in the apical part of the wing, some of them indistinct. *Al. ex.* $\frac{5}{16}$ inch.

NEPTICULA.

N. Belfragella. N. sp.

Face pale yellowish; eye-caps white; antennae brown; thorax and primaries pale gray, darker towards the apex of the primaries, and with a fuscous spot at the apex. *Al. ex.* from $2\frac{1}{2}$ to over three lines. Season, April.

COLEOPHORA.

C. bistrigella. N. sp.

Antennæ and palpi simple. The neuration is that of *C. anatipenella*, Ins. Brit., v. 3, except that in the secondaries the subcostal goes to the apex, with a branch to the dorsal margin; and the median is three branched, the last branch continued through the cell, and its connection with the second branch is faint.

Pale sordid ochreous, with a slight reddish cast on the primaries; extreme costal margin white almost to the ciliae, and a white streak from the middle of the base almost to the dorsal ciliae; dorsal margin towards the base whitish, faintly tinged with ochreous; space between the veins in the apical part of the wing darker than the general hue. *Al. ex.* half inch.

C. argentialbella. N. sp.

Palpi and stalk of the antennae simple; basal joint of the antennae tufted.

Silvery white; apical part of the primaries *very* sparsely dusted with scattered dark brown scales. *Al. ex.* half inch. Season, June and July.

Four specimens, only one of which exhibits the dusting, and it also shows in some lights a very faint, pale golden tinge; possibly it ought to be considered specifically distinct, but I think not.

ANNUAL MEETING OF THE LONDON BRANCH.

The annual meeting of the London Branch of the Entomological Society of Ontario was held at the residence of Mr. A. Puddicombe, on the 21st January, 1875.

The following officers were elected :

President, H. B. Bock ; Vice-President, G. Geddes ; Secretary-Treasurer, J. M. Denton ; Curator, C. Chapman ; Auditors, J. H. McMechan and J. Griffiths.

SYNOPSIS OF NEUROPTERA.

Dr. H. A. Hagen, of Cambridge, Mass., is working on a new and largely augmented edition of his Synopsis of the Pseudo-Neuroptera and Neuroptera of North America, and would like the co-operation of all those interested in this department of Entomology. Collectors having undetermined specimens would aid in this good work by forwarding them to Dr. H. A. Hagen, Museum Comparative Zoology, Cambridge, Mass., who will willingly name them ; the only privilege he claims is to retain for the Museum new, or rare species, which he would find necessary to describe.

CORRESPONDENCE.

ON CALOCAMPA.

DEAR SIR,—

In a paper published in the Annals of the Lyceum of New York, Mr. Morrison discusses my views on the relationship between the North American and European species of this genus. So far as they relate to the resemblance between the American *nupera* and the European *vetusta*, Mr. Morrison may be correct, and my later statement that the species cannot be regarded as "representative," incorrect. Mr. Morrison, however, charges me with saying that "*nupera* is more closely allied to *exoleta*" (i. e., than to *vestuta*), which I have never stated. I say in the

Proc. of the Academy of Natural Sciences, that "*C. nupera* appears to me to resemble the European *C. exoleta*, rather than *C. curvimacula*, in opposition to Mr. Morrison's opinion on the subject." I intended to dissent from Mr. Morrison's assertion that *C. curvimacula* may stand for the American representative of *C. exoleta*, by showing that *C. nupera* was nearer *both* the European species than *C. curvimacula*. In regard to the position of *solidaginis*, I consider it the type of a distinct genus, following Hübner and Stephens. Guenée refers the species to *Cloantha*, Lederer to *Calocampa*. Now that we have a closely allied North American representative, and that Mr. Morrison himself gives us at least a single "material structural difference," I feel warranted in considering my adoption of *Lithomia* for *solidaginis* and *germana* authoritative and reasonable.

A. R. GROTE.

ON ADITA.

DEAR SIR,—

Mr. Morrison recently corrects my statement that the tibiae are spinose in this genus. Mr. Morrison says that "the only spines visible are the pair before the spurs on the middle tibiae and a single spine (there possibly may have been two) between the two pair of spurs on the hind tibiae." I have re-examined my specimen, and I find on the outside of the middle tibiae a series of eight spines in irregular pairs before the spur, besides several finer spines, and on the hind tibiae three spines are plainly visible. The spines frequently break off, as has been noticed by European Entomologists. Perfectly fresh specimens will probably show he pres ence of more spines on the hind tibiae. The fore tibiae are furnished with a stout, terminal claw.

A. R. GROTE.

In reply to Mr. Morrison's enquiry as to the propriety of retaining *Cirroedia* Guen. (1839) instead of *Atethmia* Hubn. (1816) for a genus of Noctuidae, I would state that I gave the subject careful consideration when preparing my "List." I was finally led to adopt the older name from the following considerations. Dr. Herrich-Schaeffer (Corr.-Bl., 75) remarks that he doubts the validity of Guenée's genus *Atethmia* for the South American species. The point is here as to *subusta*, of which Mr. Morrison says that it is "South American," as if he were giving a structural character. Again, Atethmia is dated 1816, and although Hübner

adds a species "*subusta*" to the genus, such a species was not then published. Hübner's *Atethmia subusta* is given later, in 1823, in his Zutraege, under the numbers 205, 206. Now, Hübner cites in the Verzeichniss "105--106." Perhaps he had intended a different and earlier publication of *subusta* than that which was ultimately carried out. There is also some evidence that Hübner considered the European, and not the South American species as typical of the genus *Atethmia*, to be gathered from the text of the Zutraege itself.

Again, Mr. Morrison says that Gueneé "takes out" of Hübner's genus the European *Xerampelina*. Gueneé, however, in his Essai takes no cognizance whatever of Hübner's generic reference of his species. Gueneé says of *Xerampelina*: L'unique espéce qui compose ce genre a été placée *jusqu'ici* dans les Xanthies. Again, Guenée in his "Speciés General" does not, as Mr. Morrison states, refer *subusta* as the typical species of Hübner's genus. Gueneé there does not know *subusta* at all, and says of the genus: "Ce petit genre, dont je n'ai emprunté a Hübner *que le nom*, puis que dans son Verzeichniss, il se compose principalement (!) de *mes* Cirroedia," etc.

The question is one to which I had devoted considerable study, and in a more general List of our moths, upon which I am engaged, I expect to have occasion to note further evidence as to the use of *Atethmia* in European works for *Xerampelina*. I shall be glad always to note corrections to my List, which deviates so greatly from its predecessors that it should not be expected to be everywhere exhaustively correct. And although Mr. Morrison may not always be able "to see the necessity of this change," yet he will find that no generic title is there adopted without a reason.

A. R. GROTE.

DEAR SIR,—

Mr. Grote's letters in your last issue seem to contain, in the main, the reasons why he made certain errors in regard to my work, and a repetition of his former statement, to the effect that I had made five synonyms in one of my papers containing descriptions of about sixty species; the former statement does not call for any word from me, but perhaps it would not be out of the way (since we are on the subject of re-descriptions of old species) to ask why Mr. Grote has re-described within six months the common *Agrotis incivis* Guen. as a new genus and species, under the title of *Anicla Alabamæ*; or why the well-known *Orthesia ferruginoides*

Guen. is re-described as *Xanthia ralla* G. & R. ; or *Acronycta brumosa* Guen. and *innotata* Guen. as *A. verrilli* G. & R. and *Diphthera graefii* Grote ; or *Celiptera frustulum* Guen. as a new genus and species, *Litomitus elongatus* Grote ; or *Plusia ou* Guen. as *Plusia fratella* Grote; or —but we say no more. It is only human for the best of naturalists to make mistakes occasionally.

In regard to the latter statement of Mr. Grote, it is perhaps unnecessary to repeat again that of the five species of mine which Mr. Grote considers as synonyms, three were published in papers contemporaneous with mine, having priority by one day, and which I could not have foreseen; one was published on the authority of Mr. Grote himself (*Mamestra illabefacta*), and the other (*Hadena rasilis*) is not a synonym, but a distinct species, and Mr. Grote is in error in considering it identical with *Elaphria grata* Hübn.

In ignoring Mr. Grote's genera *Eucoptocnemis*, *Exyra* and others, I simply follow the example of Dr. Speyer and the best European authorities in not recognizing catalogue names unaccompanied by a generic description.

With regard to Mr. Grote's remarks on my genus *Eutricopis*, I consider *Tricopis* (which, by the way, is a synonym of *Eulecyptera*, founded by the same author) as a generic term covering all the characters of the insect or group of insects which it was founded to contain ; the three-clawed tibiæ is but one of many characters. Therefore, when I discovered a genus which approached *Tricopis* in many of its characters, but was sufficiently distinct from it, I very properly gave it the name of *Eutricopis*.

Mr. Grote does not agree with me when I unite *Bolina nigrescens* G. & R. with *fasciolaris* Hübn. *Bolina fasciolaris* is a very common and variable species ; I have examined a large series, among which many agree with Grote and Robinson's excellent figure, and as they are from the same locality, Texas, I have no doubt that it is their species which I have identified. I have also carefully examined several copies of Hübner's figures, and am confident that the two species are identical.

Mr. Grote closes with some remarks in regard to his "List," the great value of which I cheerfully acknowledge ; however, it is open to criticism in many particulars ; for instance, the omission of several of M. Guenée's species, one of the omitted species being described by Mr. Grote under a different name, and is in addition placed in a genus to which it by no means belongs. I also object to the admission at present of the genus

Ammoconia to our fauna. *A. badicollis* Grote, referred to that genus in the List, is a true *Agrotis*. I have examined the two European species of this genus, and am satisfied that it can not be retained there.

I remain yours truly,

H. K. Morrison.

Dr. Harris, writing to Hentr. (Harr. Cor., p. 11), says: "Have you ever seen a *Rhagium?* In January I obtained from beneath the bark of a tree nearly twenty males and females of *R. lineatum* Oliver."

My object in writing is to ask your readers if they have ever found *R. lineatum at such a time of the year and in such a situation.* In the summer of 1873 (being absent from home I cannot give the exact dates but probably in May or June) I spent a week in Baltimore, Md., and every morning captured several examples of this species on the walls of a church—none elsewhere. I learned from Mr. Baumhauer, of that city, that he also had taken the same species at the same place several years in succession. W. V. Andrews, New York.

RARE CAPTURES.

On the 15th Sept., as my brother and myself were returning from an Entomological foray, I saw something like a flash of orange light flit past me, and turning, I saw an insect which I did not know was found here, viz., *Colias eurytheme.* Away it was flying like a ray of sunlight, flitting from flower to flower, resting only for about the smallest conceivable portion of time, and it was only after a long and exciting chase that I managed to capture my prize. It was in beautiful condition, apparently just fresh from chrysalis, and I consider myself very lucky in obtaining it.

Among our rarities, I would also mention a very fine specimen of *Smerinthus modesta* which I obtained from a friend who found it clinging to the eaves of his cottage. We have also among our Catocalidæ, a specimen of *C. concumbens* with abdomen of a bright pink on the upper surface, closely resembling the European *C. pacta* in this respect, only the color is not quite so vivid. C. W. Pearson, Montreal.

Corrections.—Gaspé is on the *south* shore of the St. Lawrence, opposite Anticosti. In my note on p. 18 regarding *P. brevicauda*, you make it north. Also, Mr. Edward's name should have been inserted as the writer of the leading quotation in the article on *Glaucopsyche Couperi*. —Wm. Couper, 67 Bonaventure St., Montreal.

The Canadian Entomologist.

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SOME NOTES ON LYCÆNA PSEUDARGIOLUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

In September, 1873, Mr. T. L. Mead, who was then at Coalburgh, observed a ♀ *pseudargiolus* depositing eggs upon the flowers of *Actinomeris squarrosa*, and on examining the flower heads found a number of eggs. He brought home two of the females, and enclosed them in a muslin bag upon the flower heads of the same plant, near my house, the plant being not at all an uncommon one here. Several eggs were soon deposited, and in due time the larvæ were hatched and some of them were carried through to chrysalids, a change which occurred about the middle of October. The flowers of *squarrosa* becoming scarce before the caterpillars were mature, I tried the flowers of an allied plant, *A. helianthoides*, and found them to answer equally well. The eggs are laid singly on the still undeveloped flower, and the larva feeds on the petals or eats its way to the seed vessel. In no instance have I seen it feed upon the leaf of the plant. The chrysalids of this lot were found to be dead in the spring of 1874.

In September, 1874, I noticed the females of same species hovering about *squarrosa*, and confining some of them as before, obtained eggs, and three of the larvæ from these I succeeded in bringing to chrysalis. Late in the winter the chrysalids were placed in the greenhouse, and on the 13th of Feb'y, 1875, there emerged from them three true *violacea*, 1 ♂, 2 ♀. This unexpected result shows *violacea* to be the spring form of *pseudargiolus*. *Violacea* never appears here after the last of April or the first few days of May. If the weather is pleasant through April, it is extremely abundant from the first to the middle of the month. The first *violacea* which appear come in the warm days of March, so that their entire period in the imago is not far from six weeks, and after that no more are seen till the following spring. On the other hand, *pseudargiolus* appears from the 10th of May to the 1st of June; about the 1st of July there is a second brood, and one or two others during the summer.

In the light of this discovered relationship, it becomes a question as to *neglecta* and *lucia*. I am prepared to believe that *neglecta* may prove to be one of the summer broods of *pseudargiolus* in this latitude, but the point can only be determined by breeding from the egg. There are differences between the two forms sufficient to make me regard them as distinct till the contrary is proved. Moreover, Mr. Saunders found the larva of *neglecta* feeding on *leaves of cornus*, and the description of it published by him in v. 1, p. 100, CAN. ENT., does not at all agree with the larva of *pseudargiolus*. Mr. Mead has lately written me that the larvae of *neglecta* were found by him last year at Ithaca, N. Y., on flowers of *Ceanothus Americanus*—New Jersey Tea—but he does not appear to have written a description of them. We may hope that the coming season will settle the question of relationship in these cases. It may be inferred, inasmuch as *lucia* also is an early spring form (or, at least, I cannot learn that it appears at any other time than in late spring or early summer, which would correspond in New York to April and May here) that it is the spring form of the northern *neglecta*, which appears in the Catskills in June and at intervals till September.

I have a full series of drawings by Miss Peart, of the egg, several stages of the larva, and the chrysalis of *pseudargiolus*, and when I have obtained a like series of *neglecta*, I will devote a plate to them in the Butterflies of N. A.

As the plants on which the larvae were found here bloom only in the fall, the larvae of *violacea* and of the earlier broods of *pseudargiolus*, if they feed only upon flowers, must live upon a variety of plants.

NOTE.—After the foregoing lines were in type, Mr. Scudder wrote me that in Mass. "*neglecta*, *lucia* and *violacea* all appear in May," the inference being that one could not be the parent of another. I cannot but think that there is a mistake here, although Mr. Scudder's accuracy is well known. At Newburgh, N. Y., I always counted on taking *lucia* on the catkins of certain species of willow, and this was in May. But I have no mention in my diary of ever seeing *neglecta* before June. I wish that collectors interested in the subject would observe the times of first appearance of each of these species this season, and favor me with their observations through the ENTOMOLOGIST.

[Our own experience is rather adverse to the theory advanced by our esteemed friend Edwards, as to the identity of *neglecta* and *lucia*. We have never taken a single specimen of *lucia* in this neighborhood (Lon-

don, Ont.,) and do not know of any one who has, and we question if any district of our province has been more thoroughly worked up. *Neglecta*, although not very common, is taken every season here, the first brood usually occurring during the latter part of May and the early days of June, and the second brood in July and later. On looking over some old memoranda, we find the following dates of captures of *neglecta*: 1861, one specimen taken May 22nd, one on the 25th, one on the 30th, and one on the 4th of June. In 1862, two specimens on the 14th and one on the 15th of May. In 1863, two on the 19th and one on the 22nd of May, and in 1865, one on the 30th of May, one on the 4th of June, and a specimen much beaten on the 25th of the same month. On the 2nd of July a fresh looking specimen was taken, and on the 5th another, both probably belonging to the second brood. The larvae of *neglecta*, described in the paper referred to by Mr. Edwards, were taken nearly full grown on the 12th of July, feeding on a species of *cornus* (they were subsequently fed on willow); five of them produced the imago shortly after, and they were all well defined specimens of *neglecta*.—ED. C. E.]

ON THREE NEW SPECIES OF NOCTUIDÆ.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

Agrotis rufipennis. N. sp.

♂. Eyes naked, all the tibiae spinose, antennae brush-like. Thorax, head and appendages brownish red. Anterior wings brownish red, silky. Median lines faint, blackish, tolerably approximate. T. a. line nearly straight, t. p. line evenly rounded, tending to be obsolete on the veins; costal dots mark the inception of the lines. Median shade very faint. Stigmata obsolete; there is merely an indication of the reniform. Subterminal line pale, narrow, continuous; terminal space darker than the wing, the fringes lighter. Hind wings pure white, immaculate. Abdomen pale. Beneath primaries powdered with reddish, secondaries white with powdery reddish scales along costal region. No perceivable lines or dots in the type. *Expanse* 38 m. m. *Hab.* New York (Lintner). The insect looks something like a *Ceramica*.

Orthosia helva. N. sp.

♂, ♀. A large and common species from the Eastern slope, of which I have seen many specimens. It is possibly not described here for the first time, but I can find no name for it. The eyes are naked, with lashes; tibiae unarmed; abdomen conical. The size is large, Hadena-like. Fore wings dark yellow, with the lines reddish brown, obsoletely and widely geminate, distinct; t. a. waved, inner line incomplete. Orbicular concolorous, brown ringed, sub-ovate; reniform large, illy defined with a prominent inferior blackish stain; median shade well marked, nervulous. T. p. line with the inner line fine, dentate, the outer line continued as a series of black nervular points. Subterminal line broken, with a darker costal preceding shade. Fringes darker than the wing, cut with pale. Hind wings fuscous, with yellow fringes. Abdomen mostly dark yellow, with plumose side and anal tufts in the ♂, and with a feeble basal tuft. *Expanse* 40 m. m.

I refer this species to *Orthosia* rather than *Hadena*, from the lashed eyes. It is larger than, but resembles *O. ferrugineoides.*

Glœa venustula. N. sp.

A species distinguishable by the nervules, vein 1, and the median vein being finely and continuously marked with pale. The color is a light drab brown, costal and internal edges of the primaries and the edges of the collar pale. Transverse lines pale; t. a. line rounded with a dark succeeding shade. Stigmata concolorous, distinctly pale ringed; orbicular oblique, irregular, narrowed; reniform somewhat pyriform, narrowing inferiorly; s. t. line of the usual shape, pale, with preceding dark shade, distinct. Terminal line black, incomplete; fringes concolorous. Hind wings blackish fuscous, with ruddy fringes. Beneath pale reddish, fuscous on the disc of primaries; hind wings feebly irrorate, with a line and discal spot. *Expanse* 42 m. m. *Hab.* Maryland (Lintner).

The genera *Orthosia* and *Glœa (=Cerastis)* are regarded as nearly allied by Lederer and Herrich-Schaeffer. My *Glœa apiata* is cited as "*Orthosia ! apiata*" by Mr. Morrison (this vol., p. 16); the exclamation mark is superfluous, as I had already correctly referred the moth, and the latest work of an author, replacing a former one, is the one to be criticized. Mr. Morrison says of the species of *Glœa*, that the claviform spot "seems to be nearly always (?) present in this genus, although not mentioned in Mr. Grote's descriptions." As constituted by myself (Bul.

B. S. N. S., 2, 125), the genus in America is composed of *viatica* Grote, *dediva* Grote, *inulta* Grote, *apiata* Grote, and *olivata* Harvey. In none of the specimens of these species before me is there the faintest trace of the claviform. I do not know Mr. Morrison's new species, *sericea* and *pastillicans*. There is no trace of the spot in the more recently described *tremula* Harvey, from Texas. The tendency, however, throughout the Noctuidæ is to reproduce the normal ornamentation, and it is possible that certain specimens may show traces of a spot usually absent in the species to which they belong. Such cases authorize no stricture upon original descriptions of species based on specimens which do not exhibit the character.

ON SOME OF OUR COMMON INSECTS.

THE BEAUTIFUL DEIOPEIA—Deiopeia bella.

BY THE EDITOR.

This lovely moth, represented in fig. 11 (after Riley) may well claim a place among the most elegant and beautiful of the Lepidoptera. Although rare in some parts of our province, they are quite common in other localities. We have found them common in the neighborhood of Port Stanley, on the shores of Lake Erie, and they are usually common and sometimes abundant about Grimsby, Ont. We have also seen them in other collections from various parts of Canada.

Fig. 11.

This moth measures when its wings are expanded about one and a half inches. Its fore wings vary in color from lemon yellow to orange, and are crossed by six white bands, each containing a row of black dots. The hind wings vary in color from pink to scarlet red, with an irregular border of black behind. The fringes of the wings are white.

The under surface of both pairs of wings is of a deep red color, with the front edge of the fore wings yellowish; the white bands on the upper

surface of the fore wings are not reproduced, but the black dots are more prominent, and being more or less confluent, appear as broken bands. The hind wings are marked nearly as above.

The head is white, spotted with black ; the shoulder covers white, with some yellow at the base, and two black dots on each ; the thorax and abdomen whitish, the former with six black dots, the latter banded with black beneath.

LIST OF DIURNAL LEPIDOPTERA OF THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

PAPILIONIDÆ.

1. Papilio asterias Drury.

Not common in the vicinity of the city ; more abundant in the open country. May to end of August.

2. Papilio turnus Linn.

Generally common ; end of May to middle of July.

PIERIDÆ.

3. Pieris oleracea Harris.

Not common ; May and June. I have not seen an August brood.

4. Pieris rapæ Linn.

Very common, although not so extremely abundant as a few years ago, owing to the attacks of *Pteromalus puparum*. May to end of September. Var. novanglia Scudd., not common, but appears throughout the season.

5. Colias eurytheme Boisd.

Very rare ; a male in fine condition taken last season (1874) by Mr. C. W. Pearson.

6. Colias philodice Godart.

Generally abundant ; last season very scarce ; June to October ; white females very rare ; August.

DANAIDÆ.

7. Danais archippus Cram.

Generally common ; some years very scarce ; May to end of Sept.

NYMPHALIDÆ.

8. Argynnis cybele Fabr.

Common ; end of June to middle of August.

9. Argynnis aphrodite Fabr.

Not so common as last species ; end of June to middle of August.

10. Argynnis atlantis Edwards.

Very rare ; I took one example in 1872.

11. Argynnis myrina Cram.

Very common in damp meadows ; May, June and August.

12. Melitea phaeton Drury.

Rare ; June.

13. Phyciodes Harrisii Scud.

Very rare ; taken by Mr. P. Knetzing.

14. Phyciodes nycteis Doubld.

Rare ; July.

15. Phyciodes tharos Boisd. & Lec.

Very common ; June to middle of August.

16. Grapta interrogationis Fabr.

Rare ; May (hybernated) ; July to October.

17. Grapta comma Harris.

Common ; May (hybernated) end of June to October ; var. dryas Edwards not so common.

18. Grapta faunus Edwards.

Generally scarce ; last season (1874) very abundant. May (hybernated) July to October.

19. Grapta progne Cram.

Common ; May (hybernated) July to October.

20. Vanessa antiopa Linn.

Very common; end of April and May (hybernated), July to October Var. Lintnerii, bred by Mr. Pearson last season.

21. Vanessa milberti Godart.

Not common, being greatly checked by parasites in this locality. I collected over thirty larvæ last season (1874), but only got four butterflies, the remainder being full of small ichneumons. May (hybernated) August and September.

22. Vanessa J-Album Boisd. & Lec.

Not common; end of April and May (hybernated) July to October.

23. Pyrameis huntera Drury.

Generally scarce; August and September. I have not seen hybernated specimens.

24. Pyrameis cardui Linn.

Some years scarce, others common; very abundant last season (1874.) May and June (hybernated) August and September.

25. Pyrameis atalanta Linn.

Not common; May (hybernated) end of July to October.

26. Limenitis arthemis Drury.

Not abundant; July and beginning of August.

27. Limenitis disippus Godart.

Common; June to end of August.

SATYRIDAE.

28. Euptychia eurytus Fabr.

Common in open woods; June.

29. Satyrus nephele Kirby.

Not common; open fields; July and August.

30. Lethe portlandia Fabr.

Not common; July.

31. Pararge Boisduvallii Harris.

Abundant in open grassy swamps; end of June to middle of August.

LYCAENIDAE.

32. Thecla calanus Hübn.

Generally rare : abundant last season (1874) on blossoms of Asclepias and Sumac ; July and August.

33. Thecla mopsus Hübn.

Rare ; July and August.

34. Thecla niphon Hübn.

Very rare ; taken by Mr. P. Knetzing.

35. Chrysophanus Americana Harris.

Generally common ; May, June, August and September.

36. Chrysophanus hyllus Cram.

Thoe Boisd. ; very rare. I took three specimens at Lachine in Aug., 1872, and have not met with it since.

37. Lycaena comyntas Godart.

Rare ; June, July and August.

38. Lycaena lucia Kirby.

Very common ; May and June.

HESPERIDAE.

39. Epargyreus tityrus Fabr.

Common ; June and July.

40. Thorybes pylades Scudder.

Bathyllus Harris ; common ; end of May, June and July.

41. Nisoniades brizo Boisd.

Rare ; June.

42. Atrytone hobomok Harris.

Very common ; June. *Pocahontas* ♀ var. Scudder not common.

43. Anthomaster Leonardus Harris.

Very rare ; one specimen taken in 1872.

44. Polites peckius Kirby.

Wamsutta Harris ; not common ; July.

45. Hedone orono Scudder.

Not common; July.

46. Limochores mystic Scudder.

Not common; July.

47. Limochores taumas Fabr.

Ahaton Harris; Very common; end of June and July.

These are all the species that I have seen from this locality *Pieris protodice* was taken at Lachine some years ago by Dr. Barnston. *Argynnis bellona* was taken last season (1874) by Mr. R. Jack, on the south shore of the St. Lawrence, opposite Lachine, and probably will yet be found on the Island of Montreal, and I think additions will be made to the Lycænidæ and Hesperidæ when these groups have been properly worked up.

I have, with two or three exceptions, followed Mr. W. H. Edwards's synopsis in this list, both in classification and nomenclature.

I hope to soon give lists of the remaining families, and would here gratefully acknowledge the assistance given me by those friends who kindly allowed me to study and refer to their material, amongst whom I would especially mention Messrs. Wm. Couper, P. Knetzing, C. W. and G. B. Pearson.

DESCRIPTION OF A NEW NORTH AMERICAN SPECIES OF MAMESTRA, AND OF A GENUS ALLIED TO HOMOHADENA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Mamestra dodgei. Nov. sp.

Expanse 34 m. m. Length of body 14 m. m. Eyes hairy; antennae of the male simple; villosity of the palpi coarse; thorax provided with the usual fore and hind tufts; abdomen short, stout and untufted; ground color of the anterior wings gray, without ochreous or brown admixture, as in *M. lorea* Guen.; the ordinary spots are tolerably distinct, concolorous, black encircled, the reniform filled below with black, the claviform small; the median lines are simple, black and conspicuous, the interior line perpendicular, forming a triangular projection above the orbicular spot,

which it touches; below it is lobate; the exterior line is even and non-denticulate: it is incepted at about the middle of the costa, strongly produced around the reniform spot, and below it extends obliquely, reaching the inner margin very close to the interior line: the median shade is indistinctly seen below the reniform spot: the subterminal line is diffuse and undulate; a black line at the base of the dark fringe.

Posterior wings blackish, with a light fringe: traces of the discal dots and median lines.

Beneath the wings are yellowish gray, with a very distinct undulate common median line: discal dots small: the base and median portions of the anterior wings blackish.

Hab. Nebraska (G. M. Dodge.)

This species is closely allied to our common *M. lorea*, which also occurs in Nebraska; the differences will be readily seen from the description.

I dedicate this insect to my friend Mr. G. M. Dodge, already well known by his interesting contributions to this magazine.

Copihadena. Nov. genus.

Under this name I separate from allied genera a little Texan species which has just been described by Dr. Harvey, of Buffalo, as *Homohadena atricollaris*. The species cannot be referred to *Homohadena* on account of the slender claw at the extremity of the anterior tibia, and which seems to have been overlooked at the time of description. This new genus is quite remote from the few other genera of Noctuidæ which possess the above important structure, as *Dicopis*, *Copipanolis* and *Adita*; it is perhaps nearest to *Oncocnemis*, but the eyes have not distinct hairy lashes and the ornamentation is entirely different. It differs from *Homohadena*, besides the tibial claw, by the slender thorax and elongate wings; however, the ornamentation is very similar in the two genera. *Homohadena induta* Harvey, described at the same time as *H. atricollaris*, is identical with *Homohadena retroversa* Morr., from Missouri. Many of the species which are found in Missouri, Kansas and Nebraska also extend down into Texas.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 75.)

ŒCOPHORA.

Œ. basqueella.

Palpi dark brown, with a yellowish white annulus around the middle and tip of the second and third joints. Head yellowish white; antennæ dark brown, with the extreme tip of the basal joint white. Thorax above and base of the forewings brown; dorsal margin of the forewings, from the base to the ciliae, pale orange yellow, with a broad fascia of the same hue at about the basal fourth, passing across the wing and gradually narrowing to the costa. Behind this fascia to the apex the wing is brown, containing an irregular yellowish spot at about the middle of the costal margin, and a white one immediately before the ciliae. The brown color has a rich maroon tint, and not a dead lustreless hue. Legs and tarsi brown, annulate with pale yellowish. Venter brown, with two yellowish bands before the apex. *Al. ex.* ½ inch. Basque Co.

GRACILARIA.

G. belfrageella. N. sp.

Antennae purple brown; face and palpi white, the second joint of the maxillary palpi being tipped beneath its apex with purple brown; thorax and wings purple brown. The costal triangle is pale lemon yellow (nearly white), reaches the fold, where it is truncated, and it extends as a wide band along the costal margin to the ciliae. Sides of the thorax purple brown; anterior and middle legs purple brown, with white tarsi; hind legs whitish, except the apical halves of the femora, which are purple brown. *Al. ex.* $\frac{7}{16}$ inch.

THEISOA.

It is possible that this genus ought not to have been separated from *Elachista*. Its more elongate palpi, the horizontal position in repose of the wings, and the dissimilarity of ornamentation of the wing from that of other species of *Elachista*, induced me to separate *T. bifasciella* from

that genus, and make it the type of this. *Bifasciella* is not a very appropriate name for that species, since it is seldom that the second fascia can properly be called a fascia at all; usually it is only indicated by a slightly paler shade of the yellowish brown color of that part of the wing between the small white costal and dorsal streaks at the beginning of the ciliae, and sometimes these streaks are not at all distinct. The specimens from Texas do not differ from those taken in Kentucky. The species described below does not differ structurally from *T. bifasciella*, but its ornamentation is very different both from it and from all species of *Elachista* known to me, whilst it is almost exactly that of a species described by me in the *Cincinnatti Quar. Jour. Science, v. 2*, under the specific name of *fasciella*, as the type of a new genus, *Æsyle*. *A. fasciella*, however, is structurally quite distinct from *Theisoa*, and approaches much more closely to *Lithocolletis*, from which I separate it with hesitation.

T. multifasciella. N. sp.

Head brownish yellow, becoming paler on the face around the mouth. Palpi externally brown, internal surface white. Antennae alternately brown and silvery white. Upper surface of the thorax and base of the forewings brownish red. The forewings are banded with alternate wide fasciae of white and brownish red, the brownish red fasciæ being margined rather narrowly behind with dark brown. Including the brownish red on the base of the wings, there are four fasciæ of that hue and three white ones and the tip of the wing is also white. Hind wings and ciliae of the forewings pale grayish fuscous. Abdomen brown, the tip and posterior margin of each segment being white. Under surface of the forewings dull brown, that of the hind wings shining grayish fuscous. Legs and tarsi with alternate annulations of white and shining dark brown. *Al. ex.* $\frac{5}{16}$ inch.

ELACHISTA.

E. inornatella. N. sp.

Dark brown, immaculate, in some lights showing a faint purplish gloss. *Al. ex.* ¼ inch.

ITHOME, *gen. nov.*

This genus is allied to *Elachista*, *Chrysoclista*, *Laverna*, *Chauliodus* and *Perimede*.

The palpi are long, slender and (in the dead insect) drooping and slightly divergent, resembling those of *Chrysoclista*, but more slender and the joints more nearly of the same size : the third joint is longer than the second. Tongue moderate, scaled. Face full, convex, nearly as wide as long ; head and face smooth, with scales appressed ; eyes globose, of medium size ; antennae about two-thirds as long as the wings, with the basal joint a little elongate.

Fore wings lanceolate ; the costal vein reaches the margin before the middle ; the cell is acutely closed ; the subcostal vein sends three branches to the costal margin, the first being emitted just behind the middle, and the third at the end of the cell, and the second nearer to the third than to the first ; the median vein divides into three branches, the first of which is opposite to the second subcostal, and the third is at the end of the cell, and between it and the third subcostal branch is a discal ? branch which is furcate before the apex, with a branch to each margin near the apex ; the submedian vein is furcate at the base, and reaches the dorsal margin opposite to the first branch of the median.

Hind wings almost linear ; costal vein very short ; subcostal straight to the apex ; cell unclosed ; the median divides into three equidistant branches, the second of which attains the dorsal margin about the middle, and there is an independent ? discal branch, which arises at the median and goes to the dorsal margin.

I. unimaculella. N. sp.

Palpi white on the upper surface, dark brown beneath, and with about three microscopic whitish specks on the under side of the third joint ; tongue and face silvery white ; antennae, vertex, thorax and forewings dark purplish brown ; there is a small yellowish costal spot immediately before the ciliae, but the forewings are otherwise immaculate. Anterior and middle legs and tarsi brown, the tarsi annulate with whitish ; hind legs and under surface of the body yellowish silvery. *Al. ex.* ¼ inch.

At a hasty glance this species and *Eriphia concolorella* and *Elachista concolorella* may be mistaken for each other. But the more elongate palpi, narrower wings, finer scales and costal spot, as well as the white upper surface of the palpi, sufficiently distinguish this species. The other two species differ very slightly in shade of color, but may be distinguished by the structure of the palpi, those of *Eriphia concolorella* being more elongate than those of the *Elachista*. All three are obscure, plain species.

COLEOPHORA.

C. albacostella. N. sp.

Second joint of the palpi with a minute projecting tuft beneath its apex. Basal joint of the antennæ a little swollen. The head is tinged with ochreous, as also are the wings, though more faintly so; the wings are somewhat dusted with fuscous, especially towards the apex. Extreme costa from the base to the ciliae white. *Al. ex.* a little over ½ inch.

C. trilinella. N. sp.

Antennae and palpi simple: upper surface of the thorax white, the lower surface and legs tinged with yellow. Fore wings white, with a pale golden or ochreous line beneath the fold, close to and parallel with it; a darker, but not more distinct line, parallel to the costa and close to it: a more distinct ochreous line extends from the base to the apex, sending off in the apical part of the wing two branches to the costal ciliae. *Al. ex.* ½ inch.

OBITUARY.

[FROM THE AMERICAN JOURNAL OF NUMISMATICS, APRIL, 1875, VOL. IX, NO. 4, PAGE 95.]

"Mr. Philip L. Sprague, a resident member of the Boston Numismatic Society, died at Montpelier, Vt., his native place, on the sixth day of August last, in the forty-fifth year of his age. We have received from an intimate friend of his the following notice of our late member:—

"'About 1862 he commenced the study of Entomology with me in the State Cabinet of Natural History, displaying a marked taste for the Lepidoptera, and during the intervals of his business made considerable progress in biological investigations, as well as in the technology of the science. Circumstances soon induced him to direct his attention chiefly to the Coleoptera, and here his assiduity in making collections, his accuracy in the determination of species, and his studies in the microscopic anatomy of this order, gave his opinions weight among naturalists. His keen appreciation of the labors of his predecessors, and his love of neatness and method evinced themselves in all he did.

" 'At the time of his death he had been for some months a valuable assistant and member of the Boston Society of Natural History, where many of his works remain to speak for themselves. Among his associates there he was distinguished for his geniality of manner and never-failing readiness to assist younger students. At the time of his death his fame and foreign correspondence were somewhat extended, and he was actively engaged in the preparation of materials for an illustrative cabinet of the Natural History of his native State. He had published from time to time in the CANADIAN ENTOMOLOGIST and the Proceedings of the Natural History Society carefully elaborated results of his work, and contributed to various other periodicals devoted to his favorite branch of investigation. His fine private cabinet of insects, principally of the Coleopterous Order, in accordance with his expressed determination, form a part of the Museum of the Society to which he was attached, and is in itself no mean monument to his memory.' F. G. S.

" Mr. Sprague was elected a member of this Society May 5th, 1860."

CORRESPONDENCE.

RHAGIUM LINEATUM.

DEAR SIR,—

In reply to Mr. W. V. Andrews' enquiry, I would say that the above insect breeds under the bark of pine stumps. I have good reasons for thinking that it completes its transformations in September and hybernates until the following spring. I had long expected such to be the case from finding it in February and March, both living and dead, in the cavity formed by the larva in which to pupate. But in September, 1874, I found numerous specimens of the beetle that had just appeared, many of them not mature in color, and with them several specimens of the pupæ.

H. L. MOODY, Malden, Mass.

DEAR SIR,—

Mr. Andrews inquires, page 80, about *Rhagium lineatum* Oliv. The habits of this common species are well known to collectors of Coleoptera. Harris says, Ins. Inj. to Veg., p. 116: "These grubs (larvæ of *Rhagium*) live between the bark and the wood (of pines) often in great numbers together, and when they are about to become pupæ, each one surrounds itself with an oval ring of woody fibres, within which it undergoes its

transformation. The beetle is mature before winter, but does not leave the tree until spring." I can personally vouch for the accuracy of the above, having often uncovered the beetle both in the fall and winter, as well as in the spring. It is ready to fly upon the advent of warm weather, and there were unquestionably other individuals about besides those observed on the church walls. This species, curious in other respects, furnishes also in its habits of hybernating a rather remarkable exception to the general rule among the Cerambycidæ. Most species of this family in this latitude pass the winter in the larval stage. During many successive winters' collecting I have met with no other species in its mature form. Several years since a living specimen of *Microclytus gazellula* Hald. was dug out of the bark of a living white oak, quite late in October, where it would doubtless have passed the winter months. Mr. E. P. Austin tells me, in a letter written at the time, of finding a specimen of *Graphisurus pusillus* Kirby, I think it proved to be, while sifting leaves in the winter of '73—'74. The only other instance which I now remember of the occurrence of a Cerambycide in winter is given by H. F. Fay, of Columbus, Ohio, in the Proc. Ent. Soc. of Phil., 1, p. 198, in an article on "Winter Collecting." He says: "The only Longicorn I have met with is a single specimen of *Cyrtophorus niger* Lec., or a var. of *Clytus albofasciatus* Grey."——"It was found"——"in the soft wood of a decaying elm."

F. Planchard, Lowell, Mass.

Dear Sir,—

In answer to Mr. Andrews' enquiry about *Rhagium lineatum*, in Can. Ent., No. 4, I will say that I have found thousands under the bark of pine logs during the fall and at various times until the early summer months. The larva, pupa and imago are frequently found all at one time and under the bark of the same log, and I have at this time a bottle of specimens gathered in November from under the bark of a Jersey pine log not twenty miles from Mr. Andrews' residence.

A. S. Fuller, Ridgewood, Bergen Co., N. J.

ON THE USE OF CYANIDE OF POTASSIUM.

We have been favored with a letter from Mr. J. E. Chase, of Holyoke, Mass., in reference to the use of bottles containing Cyanide of Potassium for catching and killing moths. Mr. C. encloses a specimen label such as

he attaches to bottles and distributes among those of his friends who are disposed to help him in making captures. We append this for the benefit of our readers:

POISON.

Directions How to Catch Moths, etc.—The contents of the bottles are prepared by dissolving Cyanide of Potassium in water, and pouring into the bottle to the depth of half an inch: then drop in Plaster Paris until it thickens, and let it stand until hardened, keeping it corked. To catch moths with it, the best way is to take sugar from a molasses hogshead and mix with water, making it thick; spread this mixture on old posts, or trunks of trees, fences, &c., for two or three days. When the moths begin to scent the sugar, provide yourself with a small lantern giving light only on one side; visit each post and tree, and you will find moths by letting the light shine on the sweetened places. Then hold the bottle under one of them, and it will dart or fall into it; cork immediately or it will fly out. Then put the bottle in your pocket, and use another bottle to catch the next one, and by that time the first bottle will be ready for use again. You can thus visit each post, and when you reach the last one it is better to put the moths into a box, so that the new ones will not spoil them by flying among them. Some persons dip old rags into the syrup and hang them up to attract the moths.

Dear Sir,—

From a friend in the neighborhood of Salt Lake, Utah Territory, I received a small lot of Lepidoptera, and as collectors would no doubt be pleased to learn something of the fauna of that locality, I will give you a list of the insects received, viz:

Papilio daunas Boisd,
Pieris protodice Boisd. & Lec.,
Anthocaris ausonides Boisd.,
Colias eurytheme Boisd.,
Vanessa antiopa Linn.,
Pyrameis caryae Hübn.,
Lycaena anna,
Chrysophanus helloides Boisd.
Gnophaela vermiculata,
Deilephila lineata,
Platysamia gloverii Strecker,
Arctia americana,
Catocala faustina? Strecker,
Erebus odora,

Of Platysamia gloverii I received two examples, both males, and as there were none of P. cecropia among the lot, I would take it to be a proof that gloverii is not a form of that species. Besides the differences

between the two species are too marked to leave any doubt of their being distinct. Mr. Hermann Strecker informs me that he has never heard of P. cecropia being taken west of the Mississippi River. The example of Anthocharis ausonides differs somewhat from my specimen of that species from California, and resembles more the European Anthocharis belia.

EDW. L. GRAEF, Brooklyn, N. Y.

DEAR SIR,—

In reply to the synonyms selected by Mr. Morrison (on page 79 of this volume), from my frequent papers during the last thirteen years, I wish to state that *Orthosia ferrugineoides* Grote ex. Guen. is a different species from *Orthosia ralla* Grote ex. G. & R.: the latter differs by the pellucid yellowish hind wings, not clouded with fuscous, and the black dots of the subterminal line, among other characters. *Plusia ou* is twice the size of *P. fratella*, and I have seen no intermediate specimens. It is not right to express oneself in such a manner, that my synonyms in the Noctuidae, occurring from time to time during the description of over four hundred new species (in the face of the difficulties imposed upon students by the works of Gueneé and Walker) over a long period of time, appear to be charged as committed within six months. Of the six synonyms I am charged with, one is an error of Mr. Morrison's, and only two were published in 1874: the remaining three species were published and *figured* by me in 1863, 1864 and 1870 respectively. I also have shown *Tricopis* and *Euleucyptera* to be distinct, and I take issue with Mr. Morrison as to the validity of *Bolina nigrescens* as distinct from *fasciolaris*, and on the authority of my catalogue names.

Mr. Morrison remarks (p. 79) that "in ignoring (?) Mr. Grote's genera *Euceptoeneмis*, *Exyra* and others (?) I simply follow the example of Dr. Speyer," etc. Now, the fact is, that on the only occasion which Dr. Speyer has yet had to refer to one of these genera of mine, it is *adopted*, not *ignored* (vide *Leucobrephos* Speyer. Stett. Ent. Zeit., 1875. 175). There are, however, only *three* such names in my whole List, viz., *Conservula*, *Exyra* and *Leucobrephos*. The diagnosis of *Tricholita* is given by Mr. Morrison under the term "*Perigrapha*," which applies to a different form; *Euceptoeneмis* is distinctly and properly founded on structural characters given by Gueneé to the single species: *fimbriaris*. The other generic names of mine without diagnosis in the "List" replace, for one sufficient reason or another, a name previously used.

I do not consider it an adequate reply to my criticisms of Mr. Morrison's publications, or to my complaints as to some misrepresentaions of my writings by Mr. Morrison, that certain synonyms of mine (corrected previously by myself) are brought up and offered as an answer to the one and as an apology for the other. My original remarks remain rather in full force, with the one exception where they refer to *Agrotis exsertistigma*, for which latter I am sorry and have excused myself on the ground of Mr. Morrison's retention of my material. In reply to Mr. Morrison's justification of *Eutricopis*, there appears no character but the unarmed tibiae to distinguish it from other Heliothid genera in Mr. Morrison's diagnosis, and it is there expressly stated to differ by the "unarmed tibiae." Now the term implies that it is "beautifully armed," and hence is inappropriate. With regard to Mr. Morrison's insinuations as to missing species in my "List," it is the great good fortune of this "List" that it is incomplete and thus awaits changes at Mr. Morrison's hands. My List must be judged, however, by its predecessors in the same field, and not by information acquired subsequent to its issuance. I wish to draw, once for all, attention to the fact, that the most of Mr. Morrison's corrections in the shape of criticisms are *ex post facto*. Mistakes corrected by myself, determinations made by me when in England and France, are taken as part of our common stock of knowledge by Mr. Morrison, and used on occasion against me. I reply also finally to Mr. Morrison's charge as to his redescription of *lilacina*, that the author of a description, and not the authority consulted on the subject, is the one accountable for publication, while I am sorry that in certain of the successful ventures of Mr. Morrison, where my responsibility is equal, I am neither mentioned nor my courtesy acknowledged. A. R. Grote.

[Having now given both of our correspondents a fair hearing, our limited space will oblige us to refrain from publishing anything further on this subject.—Ed. C. E.]

Dear Sir,—

I have recently united *Agrotis scandens* and *muraenula* in opposition to my previously expressed opinion (Trans. Am. Ent. Soc., 1873, 431), that they were distinct. Mr. Lintner now calls my attention to the fact and gives me good reasons for adhering to my previous opinion that the species are distinct. It appears that the specimens in the Buffalo Society's collection do in fact belong to one species, but I am wrong in referring both names to them. A. R. Grote.

The Canadian Entomologist.

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PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part VI.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

55. Agrotis exsertistigma Morrison (see ante p. 26). Sauzalito, Mr. Behrens, Oct., Nos. 16 and 209.

I sent specimens of this species to Mr. Morrison, keeping no memorandum or duplicates. Afterwards I supposed, from his brief comparison, that Mr. Morrison had described Californian specimens which I had considered as *alternata* Grote, under the new name. Subsequently Mr. Morrison returns me my specimen of *exsertistigma*, and I see that it is a distinct species which should not have been compared with *alternata*, as it is structurally different by the conical abdomen; the species should have been credited as received from me. That *redimacula* and *exsertistigma* are described by Mr. Morrison without any mention being made of the fact that I supplied the material either in part (*redimacula*) or wholly (*exsertistigma*), is a breach of etiquette. Mr. Morrison should not have hesitated to acknowledge so slight an indebtedness. *Agrotis alternata* does not appear to occur in California.

28. Agrotis cupidissima Grote (see ante pp. 214 and 27.)

Mendocino, June, Mr. Behrens, No. 4 (red label); also No. 164. The Californian specimens are light red colored, with powdery geminate lines, and variable in appearance; one is pale fawn, unicolorous, without marks on primaries save indications of the stigmata and the dotted t. p. line. Again, three specimens have the orbicular somewhat V-shaped, open above. The t. p. line is more regular than in *cupida;* it is accompanied by black dots. The subterminal line is nearer the margin than in either

alternata or *cupida*, but it is more like *alternata* than it is *cupida* in its being irregular, accompanied with powdery black scales; it is preceded on costa by a blackish shade as in *cupida*. The present species I have formerly considered as *alternata* from the markings, and, on Mr. Morrison's authority as *cupida* fiom the color, but the reniform I now see is more kidney shaped than in either the Eastern *alternata* or *cupida*. I sent a specimen to Mr. Morrison to show the variability of what I supposed was his *exsertistigma*, and he informed me that the specimen was *cupida*. *Afterwards* he returned me my specimen of *exsertistigma*, recorded above, which I then saw was an entirely different species. I have subsequently adopted the view that the Californian specimens were *cupida*, and that I was in error in considering them to be *alternata*. I now reject both determinations, and consider that the Californian species is allied to both *alternata* and *cupida* and is a new species from the data given above. The habitus of *cupidissima* and size (39 m. m.) is rather that of *alternata*. The hind wings are a little paler at base in *cupidissima*, and the lunule more obvious. *A. cupida* does not as yet appear to occur in California. The provisional identification on page 27 (ante) must be erased and the present substituted. I use the number (56) for a different species.

56. Agrotis obeliscoides Gueneé.

No. 30 (red label) Mr Behrens.

The Californian specimens are very near to *sexatilis* Grote, which latter I am now inclined to consider synonymous with Gueneé's species. They appear to differ chiefly by the more constricted reniform marked with white, the want of costal discoloration and the less brightly red hue. More material is needed to make this determination certain, together with a positive identification of *obeliscoides*.

123. Mamestra passa Morrison, Proc. Bost. Soc. N. H., 2874, 139.

Unknown to me and very possibly the same as *Dianthoecia pensilis* Grote.

124. Graphiphora carina (Morrison) l. c., 158 (*Taeniocampa.*)

"California." Unknown to me.

125. Agrotes inciris Gueneé, Morr. l. c., 164.

"California." Unknown to me from California. Mr. Morrison identifies my *Anicla Alabamae* as this species too briefly described by Gueneé, who does not mention the dotted t. p. line.

126. Agrotis purpura Morrison, l. c., 164.

Unknown to me and too briefly described at present for identification.

127. Catocala Aholibah Strecker, Lep., pl. 9, fig. 5.

Sauzalitae, Aug. 27th, Mr. Behrens.

128. Catocala mariana Hy. Edwards, Streck., No. 11, 99.

"Vancouver." Unknown to me.

129. Catocala hippolita Hy. Edwards, l. c., 99.

"California." Unknown to me,

130. Catocala Cleopatra Hy. Edwards, l. c., 99.

"California." Unknown to me.

131. Catocala Perdita Hy. Edwards, l. c. 100.

"California." Unknown to me.

132. Catocala adultera Hinze, Motsch. Etudes Ent., 1857, 47 ; Grote, List 41.

"California." Unknown to me.

133. Catocala Californica Edwards, Proc. Ent. Soc. Phil., 2, 509.

California (in coll. Am. Ent. Soc.)

134. Catocala zoe Behr., Trans. Am. Ent. Soc., 3, 24.

"Searsville, Cal." Unknown to me.

135. Catocala Stretchii Behr., l. c., 24.

"Virginia City." Unknown to me.

136. Catocala irene Behr., l. c. 24.

"Fort Tejon." Unknown to me.

137. Erebus odora (Linn.)

California (Behr).

138. Agassizia urbicola Behr., l. c., 23.

San Francisco (Behr). Unknown to me.

139. Capnodes Californica Behr., l. c., 23.

"Downieville, Cal." Unknown to me.

140. Homoptera salicis Behr., l. c. 28.

Unknown to me.

141. Homoptera rosæ Behr., l. c., 28.

California, Mr. Hy. Edwards, No. 2487.

One specimen, smaller, but much resembling the Eastern *H. lunata.*

142. Pseudaglossa lubricalis (Geyer); Grote, List, 47.

California (Behrens).

143. Hypena Californica Behr., l. c., 23.

Oakland (Behrens).

144. Brephos Californicum Boisd., Ann. Soc. Ent. Belg., 12, 88.

"Se trouve au printemps dans les clairières des bois." Unknown to me.

145. Brephos melanis Boisd., l. c., 88.

"Habite les bois." Unknown to me. There is perhaps reason to surmise that neither species is correctly referred to this genus.

With the present paper I terminate the "Preliminary List," in the expectation of again taking up the subject with more material than that hitherto kindly placed at my disposal by Mr. James Behrens and Mr. Henry Edwards. In addition to the 145 species here cited, Dr. Behr has described a few species, too briefly for identification, in Mr. Strecker's publication. I regret that, while I was working on the subject, I should remain in ignorance as to the identity of Mr. Morrison's *passa* and *carina.* The former I think may be referable to *pensilis;* from the description I do not think the latter has come to my hands. In the 12th volume of the Annales de la Soeieté Belge, pp. 89—90, Dr. Boisduval enumerates 36 species of Californian Noctuidæ. They are in great part European species apparently incorrectly identified as Californian. With the exception of *Drasteria erecthea* and the two species of *Agrotis*, *jaculifera* and *saucia*, I think it very probable that the identifications are all incorrect.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 95.)

PHÆTUSA, *gen nov.*

I define this new genus with great hesitation and doubt as to the propriety of so doing. The only reason for separating the species described below, and which I place in this genus, from *Evippe (vid. E. prunifoliella, ante v. 5, p. 185)* is found in the neuration. The other characters are those of *Evippe*, and, as stated below, it is very near to *E. prunifoliella* in ornamentation. The neuration of the forewings is exactly that of *Eidothea vagatiocella (loc. cit. sup. p. 187)*, which it also resembles in ornamentation, but less closely than it does *Evippe prunifoliella*. In the latter species the last branch of the median vein of the fore wings is simple ; in *E. vagatiocella* and the species described below it is furcate at its origin. In *E. prunifoliella* and *E. vagatiocella* the cell of the hind wings is open ; in this species it is distinctly closed. In *vagatiocella* the median gives off a single branch, and there is an independent discal branch which arises at the median ; in *prunifoliella* the median gives off two branches and has the discal branch vein as in *vagatiocella ;* in this species it gives off the two branches, and has the discal branch as in *prunifoliella*, but in addition has another superior discal branch. Probably all three species should be included in the same genus, though *vagatiocella* has the palpi longer than either of the others. In *prunifoliella* the second and third joints of the palpi are of about equal length ; in this species the third joint is a little longer than the second. In other respects the generic characters are the same. In all three the vertex is wider than long, and the face nearly as wide as long and very full or convex in front. All three form a section of *Gelechia*, and *Taygete difficilisella*, *Helice pallidochrella*, and *Sinoe fuscopalidella* are very closely allied to them structurally, though differing widely from them and resembling each other in ornamentation. *Neda plutella* also resembles this species in ornamentation, but the palpi are very different, and it differs widely in several respects.

The following remarks, in addition to what has heretofore been written on these allied species, may not be inappropriate in this connection, though they contain the results of examinations of the species before I saw the species described below.

Sinoe fuscopalidella has a tongue, as I find on examination of fresh specimens, but it is short and inconspicuous. Probably it would be as well to include it with *Taygete difficilisella* and *Helice pallidochrella*, and possibly also *Gelechia obliquistrigella* in a single genus. *Evippe prunifoliella* and *Eidothea vagatioella* must, however, be separated from these because of their slender, more elongate and graceful forms and longer palpi, though they do not otherwise differ from *Helice pallidochrella* and the other species above named more than those species differ from each other. *H. pallidochrella* and *T. difficilisella* resemble each other closely in ornamentation, but *G. obliquistrigella* and *S. fuscopalidella* even more closely. The last named species may, however, be distinguished as follows: *obliquistrigella* has the second joint of the palpi brown without and white within, whilst in *pallidochrella* it is decidedly suffused with rufous on the outer surface at and towards the tip. *Obliquistrigella* is a trifle larger than the other, has the central portion of the wings streaked more distinctly with black, and has no raised tufts on the fore wings. The description of *fusco-ochrella* should be amended to state that the face is "white, faintly iridescent."

My genus *Agnippe* seems by its position in repose to be allied to *Swammerdamia*, of which no species has yet been found in this country. It also resembles that genus somewhat in ornamentation, but *pallidochrella* and *obliquistrigella* resemble it in this respect more closely, though they do not in the position which they assume in repose. Many *Gelechia*, however, have the same pattern of coloration. *Evippe* and *Eidothea* have the same position in repose with *Agnippe*, but they differ widely in form. *Sinoe*, *Helice* and *Agnippe* resemble *Laverna* in having raised tufts of scales on their wings, but many species of *Gelechia* also have them. In all these new genera the form and neuration of the wings approach more nearly to *Parasia*, *Cleodora*, &c.

P. plutella. N. sp.

The species resembles *Evippe prunifoliella* so closely that I do not deem it necessary to describe it otherwise than by referring to the differences between them. *Prunifoliella* has a small white spot on the base of the costa of the fore wings, a distinct white costal spot just before the ciliae, and a white streak in the apex, all of which are absent in this species. In *prunifoliella* the white of the dorsal margin sends three large almost triangular projections into the brown; in this species there are three scarcely perceptible emarginations only; in *prunifoliella*, except the

silvery femora of the hind legs, the legs and tarsi are black, annulate at the joints with whitish; in this species the hind legs are yellowish silvery. *Prunifoliella* has an *alar ex.* of over ⅜ inch; this species is a little under ⅜. There are no raised tufts on any of my specimens, as there are in *E. prunifoliella*, and from the condition of the specimens it is scarcely probable that they could have been removed by attrition; it is possible, however, that there may have been some small ones, as it sometimes happens that small tufts on the wings are removed in setting or by rubbing, without leaving any marks by which their former presence could be detected.

PHIGALIA, *gen. nov.*

Palpi porrected, divergent, slender and simple, with the second joint nearly twice as long as the third, and a little clavate; no visible maxillary palpi. Head and face smooth, with scales appressed, the face nearly as wide as long, but little retreating; tongue small and scaled only at the base. Eyes full globose; basal joint of the antennae rather short and broad, with a few scales depending over the eyes (possibly the remains of a projecting tuft or of an eye-cap?); stalk simple, and about two-thirds as long as the forewings. The palpi and antennae remind one strongly of some species of *Coleophora*, but the face is too broad and the vertex too short.

The neuration and form of the fore wings is almost exactly that of *Perittia obscuropunctella*, as figured by Stainton, *Ins. Brit.*, *v. 3*, the only difference being that the *Perittia* has the submedian vein furcate at the base, whilst in this species it is simple.

The neuration of the hind wings is also like that of *Perittia*, except that the fold is faintly visible; the wing is also a little narrower in the apical half. The wings are more coarsely scaled than in *Coleophora*, and the ciliae are shorter.

P. albella. N. sp.

Snowy white; under a lens a few scattered brown scales may be found in the apical part of the wing. *Al. ex.* ½ inch.

P. ochremaculella. N. sp.

I have not examined the neuration of this species, but the external characters are those of the preceding species, except that in this there is a distinct projecting tuft over the eyes.

White, the palpi dusted with pale ochreous. The forewings are marked with short and indistinct ochreous dashes, one of which is on the fold before the middle, another is placed about the middle beneath the fold, but touching it; there is another just behind the middle on the disc; one on the costal margin just before the middle, and another further back just within the costal margin. At or just behind the discal vein are two small, though distinct circular raised tufts of brownish scales placed transversely. The apex of the wing is suffused with ochreous. It is a little larger than the preceding species.

The Texas collections contain other species belonging to the *Gelechidæ*, of which descriptions will be hereafter given.

DESCRIPTION OF A NEW SPECIES OF DRYOCAMPA.

BY G. J. BOWLES, MONTREAL.

Dryocampa pallida.

Head, thorax, abdomen and wings above, of a creamy white, without any trace of bands or markings. Beneath, the body and wings are also creamy white, the costa of both fore and hind wings being near the base very faintly tinged with yellowish pink. The legs are also slightly pinkish. Antennae pale brown. Palpi and other parts of the mouth yellowish.

Described from a specimen I took at Quebec, and now in my cabinet. It is a male, body .70 in. in length, expanse of wings 1.90. Two other specimens of the moth are in the collection of the Abbé Provancher, Quebec.

This insect is closely related to *D. rubicunda;* so much so that it has been named a variety of that species by Mr. Grote, from specimens taken in Kansas by Professor Glover, and figured by the latter on his unpublished plates of Lepidoptera. I subjoin Mr. Grote's description, from the Bulletin of the Buf. Soc. of Nat. Sci., Vol. 2, No. 3.

"*D. rubicunda* Fab., var. *alba* Grote.

"Both sexes entirely of a creamy white, the wings and body having lost all yellow and rosy tintings. The feet remain pink, and the costae beneath at base are sometimes faintly suffused. Kansas."

It will be seen that the Kansas moth is identical with mine. I have no doubt but that the species is distinct from *rubicunda*. It is taken at Quebec, and is the only species of the sub-family Ceratocampadæ so far known to inhabit that locality. The distribution of this group, as given in Grote's "List" of the Platypterices and other sub-families of the Bombycidae (Nov., 1874) is interesting. All the species extend southward, some as far as Georgia, and some of them also spread into the more southerly parts of Canada. Only one *(rubicunda)* has heretofore been found in this Province, and that very sparingly. It has only been taken once, I believe, in the latitude of Montreal, and is unknown at Quebec. The new species is probably the most northern representative of the sub-family to which it belongs, and if the Kansas specimens come from the mountainous parts of that State, it would go far to support that supposition.

The early stages of the insect are as yet unknown, and it is rare in its occurrence at Quebec.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. v, p. 213.)

FAMILY CLERIDÆ

332. NECROBIA VIOLACEA *Linn.* — Length of body 2⅓ lines. Taken abundantly on the journey.

[244.] Body dark blue, glossy, minutely punctured, rather hairy. Punctures on the head and prothorax nearly confluent and larger than those of the underside of the body; antennae black, last joint subquadrangular; sides of the prothorax obtusangular; scutellum black; longer punctures of the anterior half of the elytra arranged in rows, with the interstices minutely punctured; the rows then disappear, and the whole of the apex is indiscriminately and minutely punctured; legs black with a tint of brown.

[Taken in Canada.]

333. THANASIMUS ABDOMINALIS *Kirby*.—Plate ii, fig. 5.—Length of body 4½ lines. Several specimens taken in Lat. 65°.

Body black, hairy, with longish white and some black hairs. Head punctured with two posteriorly converging impressed lines between the eyes; palpi and antennae dull rufous, last joint of the labial palpi, which are more than twice the length of the maxillary, very large and semi-cordate; last joint of the antennae, which are shorter than the prothorax, ovate and subacuminate; eyes kidney [245]-shaped, rufous, with a golden lustre; prothorax thickly punctured, not wider and not much longer than the head, constricted behind, and anteriorly with a pair of oblique impressions, one on each side; elytra minutely punctured, with larger punctures arranged in five rows, the two exterior ones reaching from the shoulder to the middle, and the interior ones not so far; the elytra are traversed by a pair of white undulato-angular bands formed of decumbent hairs; the first begins at the base below the scutellum, and running down along the suture for a little way, then diverges and forms the band, which is broadest at the lateral margin; the other band is near the apex, broad, and projects anteriorly into an angle; the legs are dull rufous; the abdomen is between testaceous and orange, with the tips of the segments paler.

[Synonymous with *T. (Clerus) undulatus* Say. Kirby's name *abdominalis* being preoccupied, was changed by Klug to *nubilus*, who did not recognize the identity with Say's species. Is occasionally taken in Canada.]

FAMILY CYPHONIDÆ.

334. CYPHON FUSCICEPS *Kirby*.—Length of body 1¾ lines. A single specimen taken.

Body lurid, downy. Head brown, mouth lurid; antennae mutilated in the specimen, but what remains is brown; prothorax very short, transverse, slightly bisinuate both anteriorly and posteriorly; disk embrowned; elytra very minutely and thickly punctured; breast and belly brown; thighs embrowned.

[Is taken in Canada.]

FAMILY TELEPHORIDÆ.

335. TELEPHORUS ATER *Linn.*—Length of body 2¾ lines. A single specimen taken in the journey from New York to Cumberland-house.

[246.] Body black, rather hairy. Head suborbicular, obsoletely channelled; mouth, palpi, and base of the antennae, rufous; prothorax rather wider than long, very glossy; disk obsoletely channelled and a little elevated on each side the channel; anterior angles rounded: elytra minutely and confluently punctured, when elevated from the body they appear embrowned; tip of the thighs, tibiae, and tarsi, rufous.

336. Telephorus Westwoodii *Kirby*.—Length of body 5¼ lines. A single specimen taken in Lat. 65°.

Body black, downy. Head suborbicular, rufous with a black anteriorly tridentate band between the eyes; mandibles and palpi dusky at the tip; antennae shorter than the body, with the scape and the base of the pedicel or second joint, rufous; prothorax rufous, rather wider than long, anteriorly rounded, posteriorly transverse with the margin much reflexed; disk slightly channelled; elytra obsoletely punctured, or wrinkled, with three obsolete longitudinal elevated lines, the outer one abbreviated at both ends; legs dusky, base and apex of the four anterior thighs rufous; posterior thighs rufous, dusky at the tip.

337. Telephorus Samouellii *Kirby*.—Length of body 5¼ lines. Taken in the route from New York, in Lat. 65°, and in the Rocky Mountains.

Very like *T. Westwoodii*, but the antennae are dusky, pale at the base; between the eyes is a faint dusky cloud; the scutellum and the legs are testaceous, as are the sides and tips of the ventral segments of the abdomen as well as the anus.

[247] 338. Telephorus Curtisii *Kirby*.—Length of body 4¼ lines. Taken in Lat. 65°.

Very like the preceding species, but it is smaller; there is a black band between the eyes; the prothorax is considerably longer and narrower in proportion, the posterior angles are more acute, and the tarsi are black.

[Taken by Agassiz's Expedition to Lake Superior.]

339. Telephorus (Malthacus) Puncticollis *Kirby*.—Plate vii, fig. 4.—Length of body 2⅓ lines. A single specimen taken in Lat. 54°.

[248]. Body black, rather hairy, with short decumbent white hairs. Head rhomboidal, lightly and minutely punctured; posteriorly obsoletely

channelled ; impressed between the eyes ; pale-yellow below the antennæ ; antennæ longer than the prothorax, three first joints underneath of a dull-red, second and third, taken together, scarcely longer than the fourth ; prothorax nearly square, lightly and very minutely punctured ; anterior angles rounded, posterior rectangular ; disk channelled, and on each side the channel longitudinally elevated ; sides luteous ; posterior margin reflexed ; elytra very minutely and thickly punctured ; lateral margin anteriorly rather pale ; legs black ; trochanters and cubits dull-rufous.

[Belongs to *Podabrus*.]

340. Telephorus (Malthacus) Lævicollis *Kirby*.—Length of body 3½ lines. A single specimen taken in the Rocky Mountains.

Body black, somewhat hoary with decumbent hairs. Head impunctured, impressed transversely between the eyes ; mouth and three first joints of the antennæ luteous ; prothorax nearly square, very glossy, impunctured ; elytra less visibly punctured than in the preceding species ; legs luteous, thighs brown at the base.

[Taken by Agassiz's Expedition to Lake Superior. Belongs to *Podabrus*.]

341. Telephorus (Malthacus) Mandibularis *Kirby*.—Length of body 2¾ lines. Several specimens taken in Lat. 65°.

Body all black, except the red mandibles, somewhat hoary with decumbent hairs. Hind-head received by the prothorax ; eyes very prominent ; antennæ longer than the prothorax ; third joint nearly twice the length of the second ; prothorax impunctured, scarcely wider than long, all the angles rounded ; disk channelled, less elevated on each side ; posterior lateral margins somewhat reflexed ; elytra black, minutely and confluently punctured.

[Synonymous with *T. fraxini* Say. Taken in Canada ; also by Agassiz's Expedition to Lake Superior.]

[249.] 342. Telephorus (Brachynotus) Bennetii *Kirby*.—Length of body 6 lines. Taken in Canada by Dr. Bigsby, and in Massachusetts by Mr. Drake.

Body black, hoary with decumbent hairs. Head suborbicular, punctured behind the antennæ ; neck rufous ; front, before the antennæ, pale yellow ; exterior margin of the nose black ; mandibles yellow at the base ; antennæ longer than the prothorax ; prothorax pale yellow, disk

elevated with a black irregular punctured spot; elytra minutely and confluently punctured, somewhat dilated externally; obsoletely tricarinate; legs black; knees rufous.

[Synonymous with *Podabrus tricostatus* Say; a common species in Canada.

FAMILY LAMPYRIDÆ.

343. LAMPYRIS CORUSCA *Linn.*—Length of body 4¾ lines. Taken at New York and Cumberland-house, Lat. 54°. In Canada by Dr. Bigsby.

Body oblong, pubescent, brown-black. Nose and mouth elongated; prothorax nearly semicircular, disk elevated: a rose-coloured arched streak dilated and yellower anteriorly adjoins the elevated part on each side; elytra obsoletely carinated, most numerously and minutely punctured.

[Belongs to *Ellychnia* Lec. Very common in Canada.]

ON GENERA IN THE MOTHS.

BY A. R. GROTE, BUFFALO, N. Y.

Since I am recently criticized for erecting new genera in the Sphingidæ, as it is thought unnecessarily, I have put together some of my thoughts on the subject in the present paper. In a review,* the friendly spirit of which I most gladly recognize, Mr. Moschler speaks of my division of the old genus *Smerinthus*, which I have restricted to the type *ocellatus*, *geminatus*, &c., and says in effect that since hybrids are known to occur between certain of the species, these could not be generically or tribally separated.† This brings up the question as to what the value of the higher divisions really is. And a little reflection will, I think, show us

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* Stettiner Ent. Zeit., 1875, pp. 202 et seg.

† "Denn in welche Tribus gehorten wohl die hybriden Nachkommen Beiden?" l. c. 208. Here the word *Tribus* is used, but the idea seems to be that of *Gattung*. At any rate "Tribus" is merely a still further extension of the idea of relationship and what objections I find applies to either.

that the higher divisions stand in a relative position to the "species." They are, in fact, extensions of the same idea. All are alike artificial in theory, and all classificatory terms are matters of practical necessity and convenience. As well might Mr. Moschler ask to what *species* do hybrids belong? Hybrids between distinct genera are noted elsewhere among animals. Collett has recently shown that the abnormal passion of the male ptarmigan in Norway leads to the production of hybrids between *Tetrao tetrix* and *Lagopus albus*. In fact this "abnormal passion" may be one of the means for the production of new species. Dr. Hagen* thinks that *Samia columbia* may be a hybrid between *Callosamia promethea* and *Samia cecropia*, species in my opinion strongly structurally and generically different. And Dr. Hagen further shows that interbreeding might be facilitated owing to the abundance of parasites which might check the due proportion of the sexes in either species. Perhaps, indeed, it may be rather owing to "abnormal passion," while the infested hybrid caterpillars might be additionally attractive to hymenopterous parasites. I am not favorably inclined to any "uniformity" in entomological nomenclature which will fall short in any way from a possible nearer expression of the facts in the case. The massing together in large genera of species offering structural peculiarities prevents our appreciation of these peculiarities, which is the point aimed at by systematic nomenclature. For instance, I cannot see why Mr. Riley, in his excellent article on the Hackberry Butterflies,† opposes the adoption of a different genus for our species, when he interestingly shows on the very first page that the allied European *Apatura* has a peculiar form, shape and arrangement of the wing scales.

Nor am I agreed that in proposing a generic name an author is obliged to construct a perfect diagnosis. The species being known to science, and all generic diagnoses being merely of comparative excellence, it cannot be expected that without a "uniformity" in comprehension there should be a "uniformity" in expression. Of course much depends on these points. Why a "uniformity" in generic designation should be so strongly urged when we see no "uniformity" in anything else relating to our mental development in the wide world, is difficult of comprehension. To me it seems that more exactness of definition is obtained by recognizing

* Bul. Buff. Soc. N. Sci., 2, 204.

† Trans. Acad. Sci., St. Louis, 1875, p. 193 et seg.

smaller peculiarities by a distinctive generic name, and that still, with every disposition to be particular, both Mr. Scudder and myself, finding that we cannot separate certain species generically, i. e. the species of *Polygonia*, *Smerinthus*, etc., are justified in feeling that our genera stand on a scientific basis. There must be differences of opinion in Entomology as in other matters. For instance, Mr. Morrison describes under the name of *Agrotis scropulana* * a species from the White Mountains, and says of it that its "delicate shades of brown, blue and creamy white place it among the most beautiful in the Noctuidæ." And another species, called by him *Agrotis opipara*, "almost approaches" the first "in beauty." The first to me seems very like the Labradorian *Pachnobia carnea*, the latter like *Agrotis islandica*. And it is obvious here that, if these resemblances are founded, we must examine our appreciation of the generic characters of *Pachnobia* carefully, that we may come to a clear understanding of whether we have to do with an *Agrotis* or not. And again, if my suggestions eventuate, we will have fresh affinities of the Mount Washington Insect Fauna with that of Labrador, and more material to illustrate the relationship of the animals which formerly may have taken refuge on Mount Washington during a period of the decline of the Glacial Epoch, when the body of the species moved further north.

ON SOME OF OUR COMMON INSECTS.

Drasteria erichtea, Cram.

BY THE EDITOR.

In fig. 12 we have this insect in the perfect state well represented.

Fig. 12.

Although it is one of our commonest moths, a day-flier, abundant almost everywhere, yet we have never heard of its having had a common name bestowed upon it. We are not going to christen it, for we are no admirer of common names where they can be avoided, and we think they can in this instance. *Drasteria erichtea* is not harsh and unpronounceable, as is the case with

* Psyche, 1, 42.

many, especially of our more recent names, as well as some that have been resurrected, and those who do not care to burden their memories with both names, may drop the latter and will still be understood if they speak of the moth as "the common *Drasteria*."

The female moth, when its wings are spread, will measure about one and a half inches; the male about a quarter of an inch less. The fore wings are grayish brown, with bands and dots of dark brown; one band crosses the wing about an eighth of an inch from the base, and a second —which sometimes does not extend entirely across—is placed midway between the first and the outer margin. There is a dull patch of brown near the front edge of the wing, between the first and second bands, and two or three prominent black dots similarly situated between the second band and the apex; the outer edge is also widely margined with brown.

The inner portion of the hind wings is similar in color to the front pair, the outer half is crossed by two darker bands irregular in outline, the space between them being occupied by a paler hue, as also is the space between the outside band and the hind margin, which latter is narrowly bordered with the darker shade. The markings on both wings vary much in intensity, being sometimes almost black, in other instances very faint.

The under surfaces of both wings are much paler, with the markings of the upper surface partially but indistinctly produced.

Drasteria erechtea appears among our earliest insects in spring, having passed the winter in the chrysalis state; it is also found up to quite a late period in the autumn. It frequents fields and meadows, and open grassy spots along the sides of our railroad tracks. Its flight is sudden, and after a short but rapid course, it as suddenly alights.

The caterpillar feeds on clover, and when full grown, measures one and a quarter inches in length or more. It has a medium sized head, rather flat in front, with darker longitudinal lines. The body above is reddish brown, with many longitudinal lines and stripes of a darker shade. There is a double whitish line down the back, with a stripe of the darker shade of brown on each side, and lower down close to the spiracles, is another stripe of the same dark hue, while between these two are faint longitudinal lines. The spaces between the segments, from fifth to eighth inclusive, are nearly black above, a feature only seen, however, when the body is coiled up; the larva readily assumes this attitude when disturbed.

The under surface is a little darker than the upper, with many longitudinal lines of a still deeper shade, and a central stripe of blackish green from the sixth to the ninth segments. The feet and prolegs are greenish and semi-transparent, with faint lines and darker dots. This larva has but three pairs of prolegs, and hence it alternately arches and extends its body in progression.

The specimens from which the above description was taken were full grown by the third week in September, when they became chrysalids, and remained in that condition until early the following spring.

ON A NEW SPECIES OF TRICOPIS AND HOMOHADENA, AND REMARKS ON HOMOHADENA INDUTA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Tricopis alencis. n. s.

This species, collected by Mr. G. H. Belfrage, in Bosque Co., Texas, Sept. 16th, differs from *T. chrysellus* by the broader, more olivaceous basal and median fasciae, narrowly united along the hind margin of the wing. The white fields of the primaries are thus less extended than in its congener. Subterminal line diffusely shaded with olivaceous, as is the terminal margin, leaving a whitish apical space. Fringes whitish, thorax light olivaceous. Hind wings less purely white, with a terminal olivaceous shading. Beneath much as in its ally, than which this is a smaller species, expanding 23 m. m. Mr. Belfrage regards this as a distinct form, and sends it under the number 117.

In a separation of the species with armed tibiae from *Heliothis*, the genera *Eulcucyptera* and *Tricopis* I cannot consider with Mr. Morrison as synonymous, since the structure of the fore tibiae offers points of distinction which must be insisted upon in order to obtain a natural arrangement of the species. Only those names in Entomology are correctly styled "synonyms" which apply to equivalent forms.

Homohadena figurata. n. s.

The body vestiture is scaly, mixed slightly with hairs. The size is that of *induta*. The color is more grayish than usual, and the basal

streak is wanting in the specimen. The uniformly dark griseous primaries have the median lines alone visible : these are narrow, black, approximate, of the usual K-shape, fused by a black dash below median vein. A series of terminal narrow black streaks. Fringes long, silky gray. Hind wings almost uniformly fuscous with whitish fringes, beneath paler with traces of a transverse line and a discal dot. Fore wings fuscous, with an outer line. Thorax and head like fore wings in color. Expanse 30 m. m. *Hab.* Nevada, Mr. Hy. Edwards, No. 2745.

The statement of Mr. Morrison, in the May number of the CANADIAN ENTOMOLOGIST, that *Homohadena induta* was the same as his *H. retroversa*, I read with surprise. From the description of the latter, after careful study, I had supposed it a redescription of *H. kappa*. Mr. Morrison says of *retroversa* : "coloration of *H. badistriga*." This is not true of *induta*, which wants the brown tinge entirely. He says the ordinary spots have "broad white annuli." This cannot be said of *induta*. Again, "the basal streak is obsolete," This is not true of *induta*, but of *kappa*. "The posterior wings are as in *badistriga*, etc.," he gives as another character, but it will not apply to *induta*. Mr. Morrison departs often from some more usual terms for color, which on that account renders it difficult at times to determine an insect from his descriptions. I feel that I have a sufficient excuse for my description of *induta*, while I am not prepared to admit the truth of Mr. Morrison's proposition that he has originally intended my species under the name of *retroversa*. I am not aware of *induta* occurring in Missouri, while Mr. Riley thought from a casual examination of *H. kappa* that he had taken that species in that State.

ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

We would invite the especial attention of all American Entomologists to the following paragraph, which appears in the circular recently issued by the Secretary of the A. A. A. S. :

"The attention of persons specially interested in Entomology is directed to the action taken by the Entomologists at the Hartford meeting, and to the fact that there will be a meeting of the Entomological

Club of the Association at Detroit, on Tuesday, August 10th (the day preceding the meeting of the Association), at which all interested are invited to be present."

We trust that a large number of Entomologists will respond to this invitation, and bring with them everything new and rare which they can lay hands on. It is especially desired that authors bring the types of new species as far as possible.

C. V. RILEY, Secretary Ent. Club, A. A. A. S.

CORRESPONDENCE.

LUNA AND PROMETHEA.

DEAR SIR,—

In the last number of Mr. Strecker's work he states that neither *luna* nor *promethea* occur at Montreal, P. Q. My friend was led astray in this matter by my asking him for these species in exchange. In my letter I said that I had not taken them, and he very naturally concluded from that statement that they did not occur here. Both *luna* and *promethea* have been bred here by several collectors, but they are rather scarce in this locality. Yours truly,

F. B. CAULFIELD, Montreal, P. Q.

BOOK NOTICES.

We have received from the author, with many thanks, a copy of his 7th Annual Report on the Noxious, Beneficial and other Insects of the State of Missouri, by C. V. Riley, State Entomologist, 8vo., pp. 196, with maps and illustrations.

This excellent report opens with a chapter on the Colorado Potato Beetle, in which is given information regarding the spread of the insect and the injuries inflicted by it, the use of Paris green and its influence on the plant and soil, as well as other details of interest. The Chinch Bug is next treated of in a more lengthy chapter, in which its history past and present

is fully given, with instruction in the use of remedies for its suppression. The Flat-headed Apple Tree Borer next claims a share of attention ; in this chapter a new parasite *(Bracon charus)* on the larva of this pest is described and figured. Following these are chapters full of interesting details in reference to Canker Worms, the Grape Phylloxera and the Rocky Mountain Locust. The work is furnished with an excellent index, and is written in a popular style, and is altogether a valuable contribution to our knowledge in the useful department of economic Entomology.

The Cincinnatti Quarterly Journal of Science, Vol. 2, No. 2. This number opens with an article on the Tineina of the United States, from the pen of our esteemed friend, V. T. Chambers, Covington, Ky. In this paper 32 new species are described and one new genus.

Among other interesting papers in this serial we notice one on Mastodon remains in Ohio, by John H. Klippart, Rambles of a Naturalist in South Florida, and The Use of Mica Plates by the Mound Builders; The Age of their Mounds, by S. S. Scoville, M. D.

BOOKS RECEIVED.

Synonymic List of the Butterflies of North America, North of Mexico (Nymphales), by Samuel H. Scudder. From the Bulletin of the Buffalo Society of Natural Sciences, February, 1875, 8vo., 30 pp.

Curious anomaly in history of certain larvæ of Acronycta oblinita Guen., by Thos. G. Gentry, 30 pp., from Proc. Acad. Nat. Sci., Philadelphia.

English Sparrows, by Thos. G. Gentry, from the American Naturalist.

Proceedings of the Boston Society of Natural History, Vol. 8, October to December, 1874.

Proceedings of the Academy of Natural Sciences, Philadelphia, October, November, December, 1875.

Newman's Entomologist to April, 1875.

The Zoologist to April, 1875.

The Scottish Naturalist, April, 1875.

The Horticulturist to June, 1875.

Journal of Education to May, 1875.

Nature to February 18th, 1875.

Science Gossip to May, 1875.

Psyche to May, 1875.

Le Naturaliste Canadien, 1875.

Monthly Report of the Department of Agriculture.

Prairie Farmer.

Indiana Farmer.

Canada Farmer.

Observer of Nature to June.

The Canadian Entomologist.

VOL. VII. LONDON, ONT., JULY, 1875. No. 7

IMPORTANT TO ENTOMOLOGISTS.

In our last we briefly called attention to the fact that the Entomological Club of the American Association for the Advancement of Science would hold its first regular meeting on Tuesday, August the 10th, (the day preceding the meeting of the Association), at Detroit, Michigan. This organization of Entomologists, effected last year at the meeting in Hartford, promises to be an important one, embracing, as it does, within its ranks most of the leading Entomologists in America. Doubtless many important subjects will come up for discussion during the meeting, and among the rest (although we do not speak authoritatively) we doubt not but that the vexed and vexing subject of Entomological nomenclature will claim a fair share of attention. We sincerely hope that some rules will be devised which will result in establishing definitely and permanently the names by which we are to know many of the common insects which surround us, and that some limit will be placed to this everlasting searching among dry bones and continuous resurrecting of names from the musty records of the past, where in the interests of our favorite science they might in many instances have better remained forever forgotten. We do not propose to discuss here the subject of the question of priority, but we do firmly believe that we need the establishment of some rules by which the permanency of our names may be assured, if we do not wish to discourage and disgust the greater number of those valuable working members of our corps who have not time to investigate the merits of the various claims set forth by those who endeavour to lead us in these matters, but who are in many instances as much at variance with each other as the great bulk of the rank and file are disposed to be with them all; not—let it be understood—at variance with them personally; on the contrary, these persevering and talented labourers are held in the highest esteem, but it is felt that in their zeal in defence of the dead they are imposing on the living burdens unnecessary and grievous to be borne.

We anticipate that a large number of specimens will be brought together for the purposes of comparison and obtaining names, and thus much valuable information be elicited. We bespeak a large attendance

of our "brethren of the net," and trust we shall not be disappointed, but that all who *can* come *will* come, and thus aid in sustaining the interest of the meetings. The Club is well officered; President, Dr. J. L. Le Conte; Vice-President, Samuel H. Scudder; Secretary, C. V. Riley. Mr. Riley, who is now in Europe, writes that he hopes to return in time to be present at the meetings.

In accordance with a resolution adopted at the time of the organization of the Club, the first meeting will be held at 2 : 30 p. m. on the day named.

ON LYCÆNA NEGLECTA, Edw.

BY J. A. LINTNER, ALBANY, N. Y.

In the very interesting paper of Mr. W. H. Edwards, published in the May number of this journal, in which another valuable addition is made to the knowledge of our Lepidoptera, by the identity therein shown of the Lycænas *pseudargiolus* and *violacea*--autumnal and vernal forms of the same species—it is suggested that *neglecta* and *lucia* may prove to bear the same relationship to one another. The possibility of this is inferred by Mr. Edwards from observations made by him, that *lucia* is an early spring form (April and May in New York), and *neglecta* a later one, "occurring at intervals from June till September."

I cannot believe that *neglecta* and *lucia* will ever be united as seasonal varieties of the same species. Several years of diligent collecting by Mr. Meske and myself in this portion of the State, embracing a range of ten miles of territory, have failed to reveal a single example of *lucia*, nor has it come under our observation in any of the collections made by others in this part of the State. We might, therefore, be almost justified in asserting that it does not occur here. We have it from Long Island collected by Mr. Graef and Mr. Tepper.

On the other hand, in that famous collecting ground, Center, on the "pine-barrens," midway betweeen Albany and Schenectady, upon the line of the N. Y. Central and Hudson River R. R., than which, we believe, the Northern United States can produce no superior locality for the Lepidoptera, *neglecta* usually, at its proper season, swarms. There have been times and seasons when, as we have traversed the roadways leading

over the yellow sands of Center and among its pines, that the air about us has seemed blue from the myriads of *neglecta* driven up from the damp sands by our approach. Here, certainly, one might confidently look for *lucia*, were it but a varietal form.

Our observations and records do not agree with those of Mr. Edwards, giving June as the earliest appearance of *neglecta*. From notes made by me, and from dates of capture appended to examples in my collection, I cite the following:

In the year 1869, on May 21st, *neglecta* occurred in great abundance, all of which noticed, with three exceptions, were males. The worn condition of some of the captures indicated that they had already been abroad for several days. The locality had not been explored since the 11th of May, when the species was not found. About the 9th of June it was observed at its greatest abundance; it was seen for the last time during this year on the 30th of July. In 1870, it was first observed on the 14th of May (none in a collecting trip on the 6th). The last recorded appearance was on the 16th of June. *L. comyntas* was seen from May 6th to Sept. 14th, continuously. In 1871, *neglecta* is recorded from May 16th to June 16th. In the following year its first record is on May 21st.

The latest date of my capture of this species is August 20th, at Schoharie, N. Y.; the earliest is at Bath-on-the-Hudson, near Albany, on May 14th (the year not stated).

The observations which I have given above, when coupled with those of Mr. Saunders appended to the paper above referred to, of the frequent occurrence of *neglecta* in his neighborhood (London, Ont.,) and non-occurrence of *lucia*, would seem almost to establish beyond question their non-identity. That these statements may receive all the consideration to which they are entitled, it may be proper to accompany them with the mention made to me by Mr. Scudder, not to be construed to the disparagement of the valued labors of others, that, as the result of an elaborate tabulation of the numerous returns made to him or collated by him, of the Rhopalocerous fauna of the various portions of the United States, the two most thoroughly worked up fields were found to be those of London, Ont., and Albany, N. Y.

As a part of the history of *neglecta*, it may deserve mention that Mr. Meske reports the species as quite rare this year at Center, where in so many preceding years it has abounded.

TINEINA FROM CANADA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Gelechia basqueella.

Œcophora basqueella, ante p. 92.

By some unaccountable error, this species is described *loc. cit.* as an *Œcophora*, while a true *Œcophora*, which I intended to publish as *Œ. australisella*, does not appear at all. I have received *G. basqueella* from Prof. Riley, taken in Missouri, as well as from Texas.

A small collection of Tineina from Canada, received by me from Mr. F. H. Belanger, of the Universite Laval, Quebec, contains the following species, all of which, with, perhaps, two exceptions, are now in the collection of the University.

Tischeria bodicella Cham.

Coleophora coruscipennella Clem. (It is proper to state here that the species described by me as *C. auropurpuriella* is the same previously described by Dr. Clemens under the above name. I have taken it at Covington, Kentucky, and at the Bee Spring camp of the Kentucky Geological Survey, near Mammoth Cave.)

Coleophora cretaticostella Clem.? I have also taken this species at Covington, but I identify it doubtfully as Dr. Clemens' species, because Dr. Clemens says "palpi white," while in these specimens they are yellowish; and Dr. Clemens also says "inner margin of the forewing whitish," which is not correct as to these specimens. In other respects Dr. Clemens' description applies accurately enough.

Tinea tapetzella Auct.?

This species is described as having the labial palpi white, with the outer surface of the second joint dark brown. The specimen before me differs by having them ochreous, with the outer surface of both joints brown. It differs also from all descriptions of *T. tapetzella* that I have seen in having the tips of the thorax and patagia reddish ochreous, though in all other respects (even to the *Ex. alar* 9 lines) it is *T. tapetzella*. I therefore place it doubtfully as that species. *T. tapetzella* is a well

known European species, feeding in dry goods, &c., and has never been described from America except in the instance of a single specimen described by Dr. Clemens from Virginia, and Dr. Clemens did not know whether that was bred in America. I have never seen it, unless the specimen in Mr. Belanger's collection be the same.

Tinea pellionella?

This well known European insect has not heretofore been recorded from this country. One of the two specimens now before me was bred from a larva taken in its case in a house in Covington; another taken at the same time and place produced an Ichneumonide parasite. The other specimen was received from Mr. Belanger. Both these specimens lack the obscure brown spot on the disc of *T. pellionella*, but have the spot on the fold and at the end of the cell, and otherwise agree with the descriptions of *T. pellionella* The case of my bred specimen was made of pieces of carpet.

Solenobia Walshella Clem.

Tinea auropulvella Cham., *ante v. 5, p. 90.* Mr. Belanger's specimen is in better condition than any of those from which I described the species, and I am enabled to correct the former description as follows: The dusting of the wings is not so much scattered as might be inferred from that description, and is more properly described as pale ochreous than as reddish or brownish golden, though in some lights they exhibit these hues distinctly. The first and second brown costal spots near the base are connected along the extreme costa, and the "last one behind the middle" connects above the fold with a narrower pale ochreous streak, which passes obliquely forwards to the dorsal margin; and the patagia are brown at their bases. In a previous paper I have described several species from Kentucky, which are white marked with brown, approaching the European *T. granella*, and in this paper shall describe several others. There seems to be an abundance of these species in America, and Dr. Clemens has described one as *T. variatella*, which Mr. Stainton suggests in his edition of the Clemens papers is probably *T. granella.* But after comparing my species and Dr. Clemens' description with Mr. Stainton's description of *T. granella* in *Ins. Brit., v. 3.*, I can not consider any of the described American species as *T. granella.*

Bucculatrix albicapitella Cham.

The specimen in Mr. Belanger's collection differs from all of my specimens in having the dorsal spot prolonged towards the apex till it meets in the apical part of the wing with the second costal streak, in having the apical spot more definite, and the dusting in the ciliæ so arranged as to form two short hinder marginal lines. I have no doubt it is the same species. The pattern of ornamentation (not the colors) of this species is almost exactly that of the *right* wing in Mr. Stainton's figure of *B. demaryella*, but the left wing in the figure is very different. *Vid. Nat. Hist. Tin., v. 7.*

Lithocolletis salicifoliella, CAN. ENT., *v. 3., p. 163.*

" *Scudderella* Frey. & Boll.? *Ent. Zeitung, p. 212.*

In the collection received from Mr. Belanger is a single specimen of this species, together with the mined leaf of poplar, from which it was bred. It has heretofore been found only in Willow leaves. It is an exceedingly variable species, some specimens being so densely dusted with brown or gray brown scales as to suggest a resemblance to the European species *L. populifoliella*, whilst others are almost free from dusting, and may be described as having a ground color of pale golden or saffron marked with white. In the former description of this species I was led by the resemblance of the more densely dusted specimens to *L. populifoliella*, as figured by Mr. Stainton in *Nat. Hist. Tin., v. 2*, and the position in which *L. pastorella* is there placed in his classification of the species of this genus, to suggest that it might be identical with *pastorella*. Perhaps the following description may convey a better idea of an average specimen than the one previously given.

Thorax and primaries bright golden or saffron yellow, according to the light, or even sometimes dull brownish yellow, the thorax and basal portion of the dorsal margin of the fore wings being largely intermixed with white and dusted more or less with black; sometimes the inner angle is of the general ground hue, scarcely dusted or marked with either white or dark brown, and then there is a median white basal streak which meets at an acute angle with a dorsal white streak about the basal fourth of the wing length. Both of these white streaks and all other white markings on the wings are more or less dusted with dark gray brown, sometimes so much as to obscure the white. Before the middle of the costa is a long white streak, which attains the middle of the wing, curving backwards; a little behind this, on the dorsal margin, is a large dorsal white streak, wide

on the margin, but shorter than the first costal streak, like which it curves backwards along the middle of the wing, being usually confluent or very nearly so with the first costal streak; a little further back, about the middle of the costal margin, is another white costal streak shorter than the first, but like it curving back along the middle of the wing, and usually confluent with the first costal and first dorsal streaks. Then follows another narrower and somewhat oblique costal white streak, opposite to which is a triangular white dorsal spot separated from it by some brown scales; just before the ciliae is a curved white fascia concave towards the apex and sometimes interrupted in the middle, and just before the apex is another similar fascia, which, however, sometimes does not attain the dorsal margin, and behind it in the apex is a short brown streak. All these white streaks and fasciæ are decidedly dark margined before, and more or less dusted with grayish brown. There is a brown hinder marginal line at the base of the ciliae, which latter are stramineous.

In the former description the white dusted with gray brown was considered the ground color, and the golden or saffron as markings on that ground, as in *L. hamadryadella* Clem., and *L. sylvella* Stainton, and *L. populifoliella* Zell., and the species was considered as belonging to the same group with the latter. In this description I have perhaps more properly considered the golden or yellowish hue as the ground color, and the white dusted portions as the markings as in Mr. Stainton's group, *3, Nat. Hist. Tin., v. 2.* Hence the apparent difference.

Since the publication of my description of this species, Prof. Frey, of Zurich, has described under the name of *L. Scuderella* a species bred by him from mined Willow leaves, gathered in Massachusetts, which is probably identical with this. At my first examination of Prof. Frey's description I thought otherwise, being unable to recognize this insect in Prof. Frey's description, though they certainly agree in one peculiar characteristic, viz., dark brown bands on the first pair of legs, to which Prof. Frey first drew attention in his description. The discrepancies between my specimens and the Professor's description are chiefly in the markings of the fore wings. But these may result from the variations in the markings of the insect itself. Prof. Frey's specimens seem to have been remarkably free from the dusting of brownish or gray brown scales, and as I understand his description, one of the two fasciæ in the apical part of the wing is not mentioned. Still, considering the difficulty of describing an insect so peculiarly marked and so variable as this species, the probability is that it is *L. salicifoliella* Clem.

Prof. Frey notices the dark anterior surfaces of the legs in this species as remarkable, but the species is by no means singular in this respect. *L. tritaeniælla* and other species are marked in the same way, and I did not consider it important to mention this character in the original specific diagnosis of either species. Some specimens of *salicifoliella* are much paler than others, and occasionally the dark margins of the fasciae are very indistinct. Prof. Frey seems to have been misled by the mention of *L. pastorella* by me in connection with this species. I wrote that this species bore a strong *general* resemblance to *L. populifoliella*, as figured *(Nat. Hist. Tin.,)* and as in that work *pastorella* and *populifoliella* are placed in the same group, I wrote that "it is not impossible that this is *L. pastorella.*" *Pastorella* and *populifoliella* are known to me only through the *Nat. Hist. Tin.*, and comparing the most densely dusted specimens of *salicifoliella* with the figures in that work, I still think it should be placed in the same group with those species.

ON ORTHOSIA RALLA, Gr. & Rob.

BY J. A. LINTNER, ALBANY, N. Y.

In the April number of this journal, page 79, it is asserted by Mr. Morrison that "the well known *Orthosia ferruginoides* Guen. is re-described as *Xanthia ralla* Gr. & Rob."

Having examined the type specimen of *ralla*, in the possession of the Buffalo Society of Natural Sciences, I am able to pronounce it entirely distinct, and further, that it differs so much from the species to which it is above referred that there would seem to be no valid excuse for the erroneous reference.

In *ralla* the anterior wings are quite produced in their outer margin at vein 3, and considerably excavated thence to the costa; this marked feature is not fully shown in the figure, in Trans. Am. Ent. Soc., i, pl vii. The transverse lines are much more decided than in *ferruginoides*. The anterior transverse line is less sinuous; the post. trans. strongly lunulated line is quite distinct. The conspicuous interspaceal black dots constituting the subterminal line, might, by the the careless observer, be mistaken for the black nervular dots or dashes of the lunules of the preceding line in *ferruginoides*.. The orbicular has an interior black dot

and a black dash inferiorly, which *ferruginoides* has not, and its annulus is scarcely defined. The reniform contains inferiorly three black spots. The black dashes which mark the tips of the veins in this are not present in *ferruginoides*, and the fringes are more heavily cut with blackish in the former. In *ralla* the secondaries are pellucid, and without a trace of lines above, while in the other they show a median line, a subterminal band, and are fuscous toward their internal margin.

In view of the marked differences in the two species, it is believed that their pronounced identity is based on an erroneous determination of *ralla* or a simple recollection of its general appearance. It is much to be deplored that synonymical dicta so frequently find their way in print, to our perplexity or annoyance, manifestly wanting in the authority of critical observation or the use of available means of information. To such a neglect we are disposed to refer the recent union, as "dimorphic forms," of three well defined species of *Agrotis*, viz., *subgothica*, *herilis* and *tricera*—entirely unsupported by observations and experiments such as have placed the polymorphic and dimorphic forms of *Papilio ajax*, *Grapta interrogationis* and *Lycæna pseudargiolus* of Edwards, outside of the field of conjecture or prejudice, in a region of absolute certainty.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. vii, p. 113.)

[250.] II.—ORTHOPTERA.

FAMILY LOCUSTIDÆ.

344. LOCUSTA LEUCOSTOMA *Kirby*.—Length of body 13½ lines. A single specimen taken in Lat. 65°.

Body obscurely rufous, clouded with darker shades. Upper lip, and large spot of the mandibles, white; palpi reddish, with the two last joints whiter, summit black; antennæ as long as the trunk, which on the upper side is subpubescent; last segment of the prothorax carinated; tegmina

cinereous, with piceous and rufo-piceous nervures; and at the base is a longitudinal mesal series of black spots; the legs are rufo-testaceous, with the summit of the thighs and the spines black: the posterior thighs above are clouded with the same colour.

[Synonymous with *Caloptenus bivittatus* Say. This species is found in Canada and the New England States, as far south as Maryland and Texas, westward to Nebraska and Minnesota, and northward to Lake Winnepeg.

345. Locusta verruculata *Kirby*.—Length of body 12¾ lines. A single specimen taken in Lat. 57°.

[251.] Body cinereous, sprinkled with black dots or punctures, and indistinct spots. Head punctured; palpi white at the tip; mandibles piceous; antennae shorter than the trunk, pale, black at the tip and longitudinally concavo-convex; prothorax with an entire longitudinal dorsal ridge, wrinkled, and warty from the wrinkles; tegmina with a reddish tint, irregularly reticulated; wings with a black mesal band, and reddish-yellow nervures; abdomen pale underneath.

[Belongs to the genus *Œdipoda* Latr. Is taken in Canada and the New England States; has been found also at Lake Winnepeg.]

FAMILY ACRYDIADÆ.

346. Acrydium granulatum *Kirby*.—Length of body 5 lines. A single specimen taken in Lat. 65°.

Body black, sprinkled with numberless very minute elevated points or granules. Prothorax cinereous, clouded obscurely with black, three-ridged; with middle ridge straight, and the lateral ones curved at the base; rudiments of the tegmina cinereous, ridged, punctured with excavated punctures; nervures of the wings black, those of the costal area white; the four anterior tibiæ are reddish, obscurely banded or rather annulated with white.

[Belongs to the genus *Tettix* Latr. Taken by White in Sir J. Richardson's Arctic Searching Expedition, on the borders of the Mackenzie and Slave Rivers, and Fort Simpson. Found also in N. E. States and Minnesota.

[252.] III.—NEUROPTERA.

FAMILY AGRIONIDÆ.

347. Agrion puella *Linn.*

Variety B. Trunk sea-green, above black with two sea-green longitudinal stripes; abdomen black, sea-green at the base, inscribed with black; legs black above, underneath sea-green or white; the stigma of the wings is blackish with a transparent margin.

C. Trunk black and white with two dorsal white longitudinal stripes; legs black; stigma of the wings black; abdomen mutilated.

Both taken in Lat. 65°.

[Hagen (Synopsis of Neuroptera of N. A., p. 98) says that this is "perhaps another species which is inextricable."]

FAMILY PERLIDÆ.

348. PERLA BICAUDATA *Linn.*—Length of body about 7½ lines. Several specimens taken in Lat. 68°.

[253.] Body black, hairy. Antennae, tibiae, tarsi, caudal setae, and wings dull testaceous; the vertex consists of a yellowish membranous spot; the joints of the caudal antenniform organs are dark at the tip.

The larva is white underneath, fusco-cinereous above; head and thorax spotted with white, with a pale longitudinal line. More than one species seems to have passed under the name of *Phryganea bicaudata.* I will not affirm that the present species is not distinct: but as the specimens were not perfect, I thought it best to consider them as belonging to that type.

[Synonymous with *P. frontalis* Newman. Taken at St. Martin's Falls, Albany River, Hudson's Bay; at Trenton Falls, N. Y., and in Ohio.]

IV.—TRICHOPTERA.

FAMILY PHRYGANIDAE.

349. LIMNEPHILUS NEBULOSUS *Kirby.*—Length of body 7 lines. A single specimen taken in Lat. 65°.

Body black, hairy with whitish hairs. Antennae are mutilated in the specimen, but the base is black: scutellum testaceous: upper wings testaceous, spotted and dotted with white except the costal area, which is without any of that colour; under wings white with testaceous nervures; legs testaceous.

350. LIMNEPHILUS FEMORALIS *Kirby*.—Length of body 6½ lines. Taken with the preceding.

Very like the preceding species, but paler, with black scutellum and thighs.

[Both species are unknown to Dr. Hagen.]

ANNUAL MEETING OF THE MONTREAL BRANCH.

The second annual meeting of the Montreal Branch of the Entomological Society of Ontario was held on May 4th, 1875, when the following officers were elected for the ensuing year :—

G. J. Bowles, President ; Alexander Gibb, Vice-President ; C. W. Pearson, Secretary-Treasurer ; G. B. Pearson, Curator ; W. Couper, M. Kollmar, T. B. Caulfield, Council.

The reports of the Council and Secretary-Treasurer were read and adopted. The Branch is progressing steadily, and our list of membership is increasing. During the past year working expenses have all been paid, leaving a balance on hand ; a number of papers have been read, and the exhibitions of local and exotic rarities were exceedingly good. The Branch holds its meetings in the rooms of the Montreal Natural History Society, University St. All business communications to be addressed to

C. W. PEARSON,
The Burland Desbarats Co'y, Montreal, P. Q.

Annual Report of the Council of the Montreal Branch of the Entomological Society of Ontario :

Your Council, in presenting their second annual report, have great pleasure in stating that the Branch has progressed steadily since its first meeting in August, 1873. During the past year eight new members were elected, making the total number of twenty, one of whom has since gone to Europe.

The papers read during the year are as follows :

"Notes on the Larva of *Leucania pseudargyria* Gueneé," by F. B. Caulfield ; "On a Dipterous Insect Destroying the Roots of Cabbage," by Wm. Couper ; "Notes of Some Species of the Genus *Grapta*, found in

the Vicinity of Montreal," by F. B. Caulfield; "On Tineidæ," by Wm. Couper; "On Tineidæ," by F. B. Caulfield; "A List of the Bombycidæ of Quebec," by G. J. Bowles; "On the Catocalidae Occurring in the Vicinity of Montreal," by C. W. Pearson; "A List of the Diurnal Lepidoptera Occurring on the Island of Montreal," by F. B. Caulfield; "On the Usefulness of Spiders," by J. G. Jack; "A List of Sphingidae Occurring on the Island of Montreal," by F. B. Caulfield.

The monthly meetings were fairly attended, and the exhibitions of Entomological material conspicuously illustrated the energy of the members in accumulating rare insects from various localities. The Branch having decided to hold their meetings in future in the rooms of the Montreal Natural History Society, it was found necessary to change the night of meeting from the first Wednesday to the first Tuesday in each month, and in order to meet the extra outlay for rental, it was decided to make the subscription twenty-five cents a month, which the Council presume will suffice for present emergencies. On the 1st of last July the members proceeded to Chateauguay Basin for a field day. The members were the guests of Mr. R. Jack, of Hillside, who treated them with true hospitality.

Your Council have ordered *Psyche*, a useful Entomological publication issued in Cambridge, Mass.

A suggestion made by your Council last year, that note books should be carried by members, has, in this instance, been fruitful in producing valuable lists and data of the occurrence of insects in our neighborhood, and we trust that some of our members will devote their leisure this season to the much neglected orders of Hemiptera, Neuroptera and Diptera.

All of which is respectfully submitted.

Wm. Couper, Chairman.

G. J. Bowles,
C. W. Pearson.

NOTES ON CALOPTENUS SPRETUS.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

The natural history of the migratory grasshopper, *Caloptenus spretus* Uhler, being imperfectly known even to our best western Entomologists, I have given the subject considerable attention during nearly two years

residence here, where I have had ample opportunity for observation. My most important discovery is that this species is double brooded. This is evident from the fact that in 1873 large numbers came here from the south, laid eggs and produced a second brood that flew south in August of the same year. This accounts for their migrations. They can not be local anywhere, because there would not be sufficient herbage to support a second brood in a region already laid bare by the first; and because in the northern part of their range the season is not long enough to mature two broods. They must, therefore, migrate every year; and their migrations are conducted as follows:

Hatching in Texas, New Mexico and Arizona early in spring, these insects, as soon as matured, fly north and deposit their eggs on this latitude about the last of May, although they arrived here this year as early as May 12th. They probably do not lay many eggs south of Nebraska, but they go much farther north. The second brood being able to fly in August, goes south with the first favorable wind, reaching Texas in September, where they deposit eggs to lie over winter. But as eggs were deposited by the first brood all along their route, from Kansas probably to the northernmost limit of vegetation; the young from these eggs are proportionally later, and, as they acquire their wings and fly south during the autumn months, each successive brood necessarily falls short of the extreme southern limit reached by its immediate predecessor, and many being retarded by contrary winds, cold and storms, eggs are deposited over nearly the whole extent of country traversed by their ancestors in the spring.

The next spring, the new brood hatching in Texas and all hatching farther north that acquire wings earlier than the 20th of June or 1st of July, fly north, while those maturing later fly south. They deposit eggs that produce a second brood, as before, which lays eggs for the spring brood. The second brood always flies south. Thus we see that this grasshopper is not forced upon its migrations for want of food, as is commonly asserted by Entomologists, but is guided in its flights by that instinct which teaches every insect to provide for its young. The natural habitat of this insect is probably the plains lying east of the Rocky Mountains, where it goes through its annual migrations as I have described. Now, let us see how it can spread into the cultivated districts of the Mississippi valley without moving directly east. When ready to fly, it always waits for a favorable wind; and, if it is going north, will take

advantage of a south, south-east or south-west wind upon which to travel. If, then, they leave their hatching ground in the far south with a south-west wind, they would be carried far to the east before reaching their northern limit. Likewise, when the second brood was ready to fly south, if the prevailing winds should come from the north-west, the hordes would be swept over Nebraska, Kansas, etc., and into Texas. A continuous south-west wind the next spring would take the spring brood still farther east, while, on the other hand, south-east winds would carry them back toward the plains.

As the *C. spretus* always leaves its hatching grounds without depositing eggs, Entomologists have jumped to the conclusion that broods raised on the plains are barren or incapable of producing young; but the fact is that they are not ready to deposit until two or three weeks after getting their wings, which time they invariably take advantage of to remove themselves several hundred miles from their place of birth.

NEW NOCTUIDAE.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

ERRATA.—In my article in the last number, *Tricopis alencis* should read *Tricopis aleucis*.

Tarache lactipennis, n. s.

Allied to *cretata*, but very much larger. Head, thorax and a narrow oblique basal patch deep brown. A metallic tuft on the thorax behind. Fore wings milk white. A subterminal broad, deep, olive shade from apices to internal margin, containing a narrow, dentate, lilac-white line. A greenish costal spot at about apical third. Terminal space whitish, with a terminal dark shade line. Hind wings and abdomen white, the former with a very slight fuscous edging. Beneath primaries wholly dark, except along internal margin; hind wings wholly white. *Expanse* 28 m. m. *Habitat* Texas (G. W. Belfrage, May 3, No. 111.)

Differs from *Tarache metallica* at once by the white secondaries and abdomen, as well as the absence of costal basal marks and the dentate

continuous lilac-white subterminal line. Perhaps the handsomest species of the genus, some of the American species of which appear to imitate *Eudryas* in their green and olive colors, as already suggested by Mr. Grote.

Ipimorpha intexta, n. s.

Allied to *I. pleonectusa* Grote. More slender in form and of a darker color. Thorax and primaries blackish olivaceous, abdomen concolorous with secondaries. Median lines trapezoidal, very nearly meeting at internal margin, even, dark, followed by a yellowish shade; orbicular subquadrate; reniform posteriorly excavate, borders concolorous with median lines; outside of t. p. line, wings a little paler, subterminal line faint, of the usual irregular shape; terminal line pale at base of fringes, bordered inwardly by a series of almost black scalloped spots; fringes blackish. Below, light ochreous, shaded with fuscous; a yellow costal apical shade. Secondaries light brown, terminal line well marked, bordered inwardly with a dark shade; beneath concolorous, with double lines faintly indicated; fringes concolorous. *Expanse* 33 m. m. *Habitat* Sharon Springs, N. Y. (O. Meske.)

I refer this species to *Ipimorpha* rather than to *Calymnia*, from the shape of the wings and an apparent indication of a thoracic tuft.

Homohadena incomitata, n. s.

In tone, color and size resembling *induta*. There is no basal dash and no markings except the median lines, which differ from *induta* in shape. They meet very nearly at internal margin. The outer line runs inwardly obliquely from its subcostal extension without being sub-medially indented opposite the basal dash, as in *induta*. The subterminal nervular dashes are sub-obsolete. The black lines are a little more broken and denticulate than in *induta*, in some specimens sub-obsolete.

Hind wings with very faint traces of the median line, which *induta* shows plainly, and is said to be absent in *retroversa* as in *kappa*. Beneath the line is fragmentary. From the fact that *induta* has a median line beneath and "*retroversa*" is said to have none, and has a basal dash on forewings and "*retroversa*" is said to have none, there is a chance that Mr. Morrison intended *incomitata*, which differs from *induta* in both these points. Mr. Morrison says, however, that he described *induta*; in this case, I think Mr. Morrison's description may with propriety be discarded from the facts in the case *Habitat*, Texas (G. W. Belfrage, No. 75.)

CORRESPONDENCE.

DEAR SIR,—

In accordance with request in last C. E., I send you a list of some captures of Diurnal Lepidoptera, made by me in various localities :

1. Danais erippus (everywhere.)
2. Euptoieta claudia, N. Y., N. J., Oh.
3. Argynnis atlantis, Pa,
4. " bellona, N. J., Oh.
5. " myrina. N. J.
6. " idalia, Mass., N. J.
7. " cybele, Mass, N. J.
8. " aphrodite, N. J.
9. Phyciodes tharos, N. J.
10. " nycteis, Oh.
11. Vanessa interrogationis, N. Y., N. J.
12. Vanessa faunus, N. Y., N. J.
13. " comma, N. Y., N. J.
14. " progne, N. Y., N. J.
15. " antiopa, (wide.)
16. " var. album, N. J.
17. Pyrameis atalanta, N. J., N. Y., Oh.
18. Pyrameis cardui, N. J.
19. Junonia coenia, N. J., Oh.
20. Apatura idyia (clyton), N. J.
21. Lybithea motya (very rare), N. J.
22. Lycæna thoe, N. J.
23. " phleas, N. Y., N. J., Oh.
24. " comyntas, N. Y., N. J.
25. " violacea, N. Y., N. J.
26. " neglecta, N. Y., N. J.
27. Thecla damon (smilacis), Md.
28. Eurema nicippe, N. J. (rare), Md., Oh.
29. Eurema lisa, N. J., Oh., Md.
30. Pieris protodice, Pa., Md., Oh.
31. " oleracea, N. Y.
32. " rapae, N. Y., N. J., W. Va., Oh.
33. Catopsilia eubule, N. J. (rare.)
34. Meganostoma caesonia, Oh.
35. Colias philodice (wide.)
36. Papilio philenor, N. Y., N. J., Oh.
37. Papilio hesphontes, Mich.
38. " ajax, Mich., Oh.
39. " turnus, N. Y., N. J.
40. " var. glaucus, N. J.
41. " troilus, N. J.
42. " asterias, N. Y., N. J., Oh.
43. Thymele tityrus, N. Y., N. J., Oh.
44. Thorybes bathyllus, N. J.
45. " pylades, Pa.
46. Pamphila ahaton, N. Y., N. J., Oh.
47. Pamphila huron, W. Va., Md.
48. " wamsutta (wide).
49. " hobomok, N. J.
50. " massasoit, N. J.
51. Thymeticus Delaware, Pa.
52. Thecla favonius, N. Y.
53. Nisoniades brizo, Mass., N. J.
54. " catullus, N. Y., N. J.

The localities of the above species (captured by myself) may be relied on.

W. V. ANDREWS.

36 Bœrum Place, Brooklyn, N. Y., June 2nd, 1875.

DEAR SIR,—

As long ago as August 13th, 1829, Hentz, writing to Harris, notices the fact that *Megacephala (Tetracha) Virginica* and *Carolina*, although externally like *Cicindelæ*, have the habits of the *Carabidæ*. May I ask if any good reason can be assigned why this genus should not be placed after *Cicindela* and not before it, thus bringing it into closer proximity to the family to which it seems to be most closely allied? See Harris cor., p. 77 and 78.

W. V. ANDREWS.

New York. March 29th, 1875.

DEAR SIR,—

I venture to suggest an improvement in Mr. Chase's "Cyanide Box," as described in your May No.

For reasons obvious enough to the chemist, the plan of dissolving the Cyanide of Potassium in water is not so good as that of pounding it and intimately mixing it with the Plaster of Paris, the water being unable to take up but a comparatively small quantity of the Cyanide. On page 208 of your fifth volume I gave a good recipe for making a collecting box.

W. V. ANDREWS.

36, Boerum Place, Brooklyn, N. Y., June 21st, 1875.

DEAR SIR,—

In number 12 of Mr. Strecker's work, it is claimed that his number 11 was printed in "August, 1874." I have before drawn attention to the fact that I can find no record of the issue of any nnmber of this part before November. The point is raised on account of the publication by myself of three species of Catocala in the Trans. Am. Ent. Soc. for September, 1874, claimed to be superseded by Mr. Strecker's notice of the same species in "August." I am of the opinion that a work published privately and irregularly by an author should not take precedence over one published by a Scientific Society, on testimony consisting of the mere assertion of the interested author. It is possible that persons who live nearer Reading than I do may be in possession of facts which will show that none of Mr. Strecker's dates are reliable. For myself I think they are not accurate from a variety of circumstantial evidence. In one case a species is described under a date apparently before it could have been received by Mr. Strecker. I should have been glad to have noticed that Mr. Strecker had added his synonyms of *C. illecta* Walk. (= *C. magdalena* Strecker) and *C. nuptialis* Walk (= *C. myrrha* Strecker) to his other corrections.

In his disquisition on *Samia columbia*, Mr. Strecker thinks Dr. Hagen's suggestion might be true as to its being a hybrid between *promethea* and *cecropia*, were it not that *promethea* does not occur at Montreal. He has been already corrected on this point in the CANADIAN ENTOMOLOGIST; there is also the fact that *columbia* is described originally from Maine. The fact that *Gloveri* is suggested by Dr. Hagen to be *columbia*, is also sagaciously left out of sight by Mr. Strecker.

With reference to *Californica*, Mr. Strecker does not know my paper published in the Trans. of the American Philosophical Society, Nov., 1874, or chooses to ignore it. His ignorance as to where *Californica* is described shows an unacquaintance even with the publications of the Entomological Society of Philadelphia, and I have shown that the synonymy in his work is copied from catalogues, etc., and is no proof of bibliographical knowledge, and therefore quite superfluous. And while Mr. Strecker very properly quotes Mr. Kirby's correction of my generic name, he purposely ignores the fact that Mr. Kirby retains for the species from the West the name *Samia Californica*, to which I believe it to be justly entitled, although Mr. Strecker calls it "*Euryalus*."

A. R. GROTE.

DEAR SIR,—

In the "Preliminary List of the Noctuidæ of California," CAN. ENT., 7, 68, I have cited a species under the number 107 with the name *Agrotis excellens*. This name is used by Dr. Staudinger for a different species previously, and may be changed for the Californian species to that of *Agrotis perexcellens*.

A. R. GROTE.

INSECT CAPTURES.

In our issue for July, 1874, p. 140, we noticed some rare and interesting captures made by one of our members, Mr. F. C. Lowe, of Dunnville, Ont., during a tour made by him in the county of Essex. At that time, when near the village of North Ridge, he secured a very handsome and perfect specimen of *Papilio marcellus* (the second recorded specimen taken in Canada), and saw on the wing two others which he did not succeed in capturing: besides which, he took several specimens of *Papilio thoas*, a species also extremely rare in Canada. These, with many others, were taken between the 10th and 20th of June.

This year, Mr. Lowe revisited the same locality, occupying the time between the 6th and 30th of June in exploring that district, with the view of securing further specimens of *marcellus*. In this respect his zealous and praiseworthy efforts have not been crowned with success; not a single *marcellus* was seen during the whole period; probably the chrysalids had perished in consequence of the severity of the past winter. Several *Papilio thoas* were seen, but none taken.

Among his captures we observed two handsome examples of *Limenitis ursula;* also, fine specimens of *Papilio troilus* and *asterias*, *Eudamus tityrus*, *Neonympha eurytris*, *Hesp, oileus*, *Alypia Langtonii*, *Spilosoma collaris* Fitch (said to be a variety of *Euchetes egle*), *Baptria albovittatta* and several other species which we were unable to determine. There were also several handsome Diptera and Hymenoptera.

Among the Coleoptera was a female specimen of *Phanaeus carnifex*, captured near Windsor, an insect, so far as we know, never before taken in Canada; also, good examples of the following species: *Trichius bidens*, *Desmocerus palliatus*, *Clytus speciosus*, *Ædilus obsoletus*, *Cetonia fulgida*, *Cotalpa lanigera*, *Necrophorus Americanus*, *Callandra pertinax*, several handsome Curculios new to us, besides a number of other species less noteworthy.

BOOK NOTICES.

Field and Forest.—We have received the first two numbers of this new periodical, devoted to general Natural History, to which we tender a cordial welcome. It is an eight-paged monthly, uniform in size with our own journal, in every respect well got up, and containing many things to interest the Entomologist, the Botanist and general Naturalist. It is edited by our esteemed friend, Chas. R. Dodge, of the Agricultural Department, Washington. While this serial is to be devoted to Natural History in general, it will also be the Bulletin of the Potomac-side Naturalists' Club of the District of Columbia. Under the control of such an energetic and pains-taking man as we know the editor to be, we doubt not but that this journal will prosper, and be the means of furthering the interest of many departments of natural science. We sincerely wish it long life, and commend it to our readers. It is published at one dollar per annum; address—Editor "Field and Forest," P. O. Box 273, Washington, D. C.

The Canadian Entomologist.

VOL. VII. LONDON, ONT., AUGUST, 1875. No. 8

ON SOME OF OUR COMMON INSECTS.

THE LUNA MOTH—Actias luna Linn.

BY R. V. ROGERS, KINGSTON, ONT.

If any of the insect host is a proof of high art in nature, and of the beauty of the Creator's thoughts, it is most assuredly the fair creature whose name is mentioned above. Allied to families whose members are among the greatest of the insect world, and having cousins and connections surpassing in size and beauty all others of their kingdom in this Dominion, still this moth is as pre-eminent above its fellows as is its namesake—the fair empress of the sky—above the lesser lights that rule the night.

So conspicuous is the Luna in her royal robes that she has a right to feel slighted at being thus long almost unnoticed in the pages of the ENTOMOLOGIST, and now it is hard upon her to be described among "Some of our Common Insects;" but blue blood always tells, and queenly grace and beauty will ever distinguish the Luna from among the *profanum vulgus* of the Articulata.

And now for a biographical sketch of this beauty from the cradle to the grave, and beyond that, after it assumes the resurrection attire, to that day when, its work accomplished, it lays itself down that its body may mingle again with its parent dust.

The head of the caterpillar is nearly elliptical in shape, and of a pearl color; the rest is of a delicate pale and very clear bluish-green color. A very pale yellow stripe extends along each side of the body, from the first to the tenth segment, just below the line of the spiracles: and the back is crossed, between the rings, by narrow transverse lines of the same color. After the manner of its kith and kin, each segment is adorned with small pearly warts—tinged with purple—five or six in number, each furnished with a few little hairs. At the end of the tail are three brown spots, edged above with yellow.

When at rest, this magnificent caterpillar (which, by the way, is very similar to that of its congener, *Telea polyphemus*, save that the latter is destitute of the lateral yellow stripe, and the bands between the segments, the tail being bordered by a brown V-shaped mark) is nearly as thick as a man's thumb; its rings being bunched and body shortened, the length is only about two inches, but when it sets out on its travels, it stretches itself to about three inches. In the CAN. ENT. (vol. 6, p. 86) Mr. Gentry describes an interesting variety in which the general color is a dull reddish brown; the lateral and transverse stripes of yellow have vanished, the abdominal spots shine conspicuously, but without the yellow edging; the pearl colored warts with their purple edge have, however, assumed a richer hue, and blaze like a coronet of rubies.

When the larva has passed its allotted days in eating the leaves of the hickory, beech, oak, or walnut, and is thinking seriously of preparing its silken shroud and the casket in which it is to lie until its resurrection morn, it casts about and draws together two or three leaves of a tree, and within this hollow spins an oval and very close and strong cocoon of whitish silk. It is about 1¾ inches in length, of a chestnut brown on the outside; very thin, and frequently rough on the surface; covered with warts and excresences, but seldom showing the print of leaves. Harris says that the cocoons are formed on the trees, and that they fall to earth with the leaves shaken off by autumnal gales; but other observers assert that the larva crawls to the ground just before its change, and there prepares for its future transformations.

In this state, too, the Luna greatly resembles the Polyphemus, and many a collector having—after careful searching—got together a fair supply of what he deems Luna chrysalids, is greatly chagrined by finding dusky, one-eyed, giant Polyphemi issue from the silken tombs, instead of a bright throng of empresses of the night in their delicate bridal attire. The Polyphemus cocoons are, however, white or dirty white; rather smaller than the Lunas, with rounded ends; sometimes angular, because of leaves moulded unevenly into the surface, and generally coated with a white powder.

About the month of June the Lunas awake from their long and death-like sleep, burst asunder their cerements—having first loosened the compact threads by ejecting a liquid—and issue forth in all their glory, no more to be mistaken for the sober one-eyed Cyclopeans, but resplendent in gay attire. The wings, which expand from 4¾ to 5½

inches, are of a delicate light green color, and the hinder ones are each prolonged into a tail of an inch and a half or more in length, longer, indeed, than those of the day-flying Papilios. Along the front edge of the fore wings is a broad purple-brown stripe, extending also across the thorax, and sending backwards a little branch to a glittering, eye-like spot near the middle of the wing. These eyes (of which there is one on each of the wings) are transparent in the centre, and encircled by rings of white, yellow, blue and black. The hinder borders are more or less edged with purple brown. All the nervures are very distinct and pale brown. Near the body the wings are densely covered with hairs. The under sides are similar to the upper, except that an indistinct undulating line runs along the margin of both wings.

As for the body that bears these lovely appendages, the thorax is white, sometimes yellowish or greenish, crossed by the purple-brown stripe that traverses the whole length of the upper edge of the front wings; the abdomen is of the same color as the thorax, and covered with white hairs like wool. The head is white and small, and adorned with wide, flat and strongly pectinated antennae of a brownish tinge. The legs are purple-brown.

Such is Luna in her various transformations to outward appearance; notwithstanding her size and loveliness, her habits and peculiar instincts are not very noteworthy. The gift of superior beauty, as among the highest of animals so in the insect world, is not frequently accompanied by remarkable intelligence or superior sense; and the most gaudy butterfly or moth is a fool in comparison with the dingy-colored bee. The caterpillars of butterflies and moths have some various instincts—chiefly in the direction of silk spinning and sepulchre building—but the perfect insects only live "to increase and multiply their race, and embellish nature. Their existence in the perfect state is usually very brief; it is one of the prettiest of honeymoons, and often love subdues and destroys every other passion. The gourmandizing caterpillar is never troubled by the ardent flame which consumes even the thought of sipping the nectar of the flowers that rival in beauty the wings of the perfect representation of elegance and love. The early insect lives and eats, and the perfect form lives and dies."

DESCRIPTION OF A NEW CALIFORNIAN AGROTIS.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

Agrotis observabilis, n. s.

♀. Fore tibiae unarmed; middle and hind tibiae spinose. By the flattened abdomen allied to *cupidissima*. Fore wings dark blackish brown, with the terminal space paler, somewhat olivaceous. As in *exsertistigma*, the orbicular is open, triangulate, broadly pale margined, fusing superiorly with a pale subcostal shade extending from the base of the wing above this spot. Unlike *exsertistigma*, the orbicular and reniform are black, the ground color of the median space about them being powdered with deep yellow. A black basal dash before the geminate, waved, t. a. line; the latter interrupted by the subcostal shade and with an interior pale shading. Claviform moderate, pale-edged. T. p. geminate, the inner line scalloped, the outer even, enclosing a rather broad pale space; the line is very slightly sinuate, not depressed opposite the cell. Subterminal line nearly straight, dark, with a very pale powdery exterior shade. Subterminal space darker shaded on costa, relieving the costal dots distinctly. Terminal line dentate. Hind wings dark fuscous with pale interlined fringes. Beneath quite pale, faintly ruddy and subirrorate, with common exterior line fading towards internal margins and discal marks. Collar pale, edged behind with black; tegulae blackish. *Expanse* 35 m. m. Hab. California (Behrens, No. 376.)

TINEINA FROM CANADA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from p. 128.)

Argyresthia Goedartella Auct.

This beautiful and well known European insect is now for the first time discovered in this country. I quote Mr. Stainton's description from *Ins. Brit., v. 3, p. 187.* "Head yellowish white. Face and palpi white. Antennæ white, annulate with fuscous. Anterior wings white, sometimes suffused with golden, with an oblique golden fascia from the base of the

costa; a golden fascia in the middle, furcate on the costa, one arm reaching the costa before the middle, the other a little before the apex; between them are generally a few golden spots on the costa; *beyond is another golden fascia, which, indeed, occupies the whole apex except a small white spot on each margin. Ciliæ pale grayish brown.*" (The italics are mine.) "Posterior wing gray with paler ciliæ. (The anterior wings are sometimes so much suffused with pale golden that the markings are almost obliterated.) Common among Birches in June and July. The larva feeds under the bark and in the young shoots of the Birch in March and April. *Al. ex.* 6 lines."

The single specimen before me is silvery white and the fasciæ are brown, golden, or topaz red with golden, according to the direction of the light. In lieu of that part of Mr. Stainton's description which I have italicised, I would say that in the apical part of the wing is an oblique broad fascia, nearest to the apex on the costal margin, where it contains a white streak, and it sends a branch to the dorsal ciliae so as to enclose a white spot at their base. Behind this fascia a narrow curved white one crosses the wing, and at the apex is a golden spot. It is a more handsome species than *A. andereggiella*, next after which as to beauty I would place *A. visalicella* Cham. *A. undulatella* Cham. and *A. Belangerella*, described below, are plain species.

The following are new species:

Argyresthia Belangerella. N. sp.

Head, antennae and palpi white, except that the antennae are annulate with dark brown and the face is a little suffused with yellow. Thorax on top and dorsal margin of the wings beneath the fold white, extending nearly to the tip. The other portions of the wings and sides of the thorax above them grayish brown. The grayish brown hue crosses the fold a little in the basal part of the wing, and the white crosses it a little at the base of the dorsal ciliae. There is a distinct dark brown dorsal spot just beyond the middle, but it does not entirely interrupt or cross the white part, and there are two smaller brown spots on the fold, near to and just behind it. There is also a somewhat indistinct brown spot about the middle of the costal margin, behind which and extending to the apex, at the base of the costal ciliae, is a row of alternate white and dark brown spots, and there are two brown spots within the dorsal ciliae in that part of the white which crosses the fold as above stated

There are also a few small white spots near the apex. Ciliae grayish streaked at the apex with brown. Legs yellowish white, the anterior pair brown on their anterior surfaces. *Al. ex.* ½ inch. Its nearest known American congener is *A. undulatella* Cham., but it is closely related to such European species as *A. spiniella* Zell. This collection also contains another species, marked No. 54, but too much injured to be recognized or described.

Bucculatrix Canadensisella. N. sp.

The ornamentation of this species differs from that of any other yet found in this country, and though allied to *B. cidarella* of Europe, it is still quite distinct.

Head white. Tuft tipped with dark reddish brown, and the face faintly tinged with purplish fuscous. Upper surface of the thorax brown margined all around by white. Base of the fore wings white, followed by an oblique brown fascia, which is nearest the base on the costal margin, and is followed by an oblique parallel white fascia; all of these are placed before the middle and are followed by a large brown patch which occupies the entire wing to the ciliae, except that it contains a white spot on the middle of the costal margin. The brown patch is margined before on the dorsal margin of the wing by a small tuft of raised brown scales. At the beginning of the dorsal ciliae is a white spot placed a little before, but becomes almost confluent with a longer white costal streak. Behind these streaks to the apex the wing is pale brown, with a darker velvety brown apical spot. Ciliae pale yellowish, with a dark brown hinder marginal line before their middle, not extending into the costal ciliae. Hind wings pale fuscous. *Al. ex.* ⅜ inch.

Gracilaria pulchella. N. sp.

The palpi in the single specimen of this species in the collection are broken off. Antennae dusky yellow, faintly annulate with brown. Head yellowish, with faint violet reflections. There is no trace of the costal triangle, nor, indeed, of any markings on the fore wings, which, and the thorax, are reddish yellow, or perhaps, more properly, are very pale or yellowish brick red, with strong violet and purple reflections, especially towards the apex of the fore wings. Hind wings grayish fuscous; abdomen grayish fuscous, with the tip pale yellow. Tarsi of the 1st and 2nd pairs of legs white, with the 1st pair of legs brownish red. The under surface of the thorax and the 2nd and 3rd pairs of legs dark gray, with the tibiae and tarsi of the 3rd pair yellowish. *Al. ex.* ½ inch.

Elachista unifasciella. N. sp.

Antennae brownish purple; palpi white. Head, thorax and fore wings brownish purple, in some lights reddish purple. There is an oblique white fascia just before the middle of the fore wings, which is a little nearer the base on the costal than on the dorsal margin, and the color of the wing is much deeper behind the wing than before it. There is a small white spot just before the dorsal ciliae, and a little behind it is a narrow costal white streak, which passes obliquely backwards nearly across the wing. The legs and tarsi are marked with brownish purple and yellowish white bands and spots. *Al. ex.* ¼ inch. The white markings on the wings are metallic in some lights. I think it is not likely to be mistaken for any known species.

Anarsia? albapulvella. N. sp.

I have but a single specimen of this species, and have not examined the neuration. Possibly it belongs to *Ypsolophus*, to which it is allied by the ciliation of the antennae, apparent under the lens. But the ornamentation is unlike that of any *Ypsolophus* known to me, and the width and form of the wings and form of the palpi ally it to *Anarsia* rather than to *Ypsolophus*. The checkered ornamentation of the antennae reminds one of a *Plutella*.

Antennae dark brown, with a white spot on each side of each joint. Palpi dark brown, the tuft tipped with white, with a white line on each side of each joint. Tongue white. Head grayish brown. Fore wings and thorax brown, the wings sparsely but distinctly dusted with white, especially towards the apex, where there is a white dusted fascia which is strongly angulated posteriorly, following the course of the apical margin and connecting a small ochreous spot at the beginning of the costal ciliae with one at the beginning of the dorsal ciliae; there are six transversely oblique oblong narrow white spots around the base of the ciliae, two of them being on the costal and four on the dorsal margin. Ciliae ochreous. Posterior wings gray, with whitish ciliae. Legs and tarsi dark brown, the tarsi annulate with white. *Al. ex.* ⅜ inch.

ON TWO NEW SPECIES OF HOMOPTERA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Homoptera uniformis, nov. sp.

Expanse 40 m. m. Length of body, 18 m. m.

Palpi long and slender, the second joint light and contrasting, the third dark, tipped with light. Thorax as usual in the genus. Abdomen cylindrical, with slight white dorsal tufts. Anterior wings uniform dull gray-brown, sprinkled with black atoms; the usual black clear-cut transverse lines are obsolete, the subterminal line only is seen as a black diffuse shade crossing the wings; some basal black markings; ordinary spots black, very distinct, close together; the orbicular a round spot, the reniform a sublunate black mark; a series of black dots before the concolorous fringe.

Posterior wings concolorous with the anteriors, having the same diffuse subterminal band, which, however, becomes condensed into a black spot at the anal angle. Beneath gray, concolorous, without lines; distinct black discal dots and a series of bicolorous white and black dots before the fringe.

Hab. Georgia.

Received from my friend, Mr. George W. Peck, of Brooklyn. The absence of the usual markings will distinguish this species, which does not differ structurally from the other *Homoptera*.

Homoptera cinerea, nov. sp.

Expanse, 45 m. m. Length of body, 20 m. m.

Palpi gray, of normal form. Collar, thorax and abdomen cinereous black. Pterygodes well marked. Abdomen strongly tufted, the two anal segments ochreous, very distinctly so beneath. Both wings shining, cinereous, on a black ground; the outer half of the wings have a slight purple tinge in certain lights; orbicular spot a black dot; median shade well marked, angulate on the median vein, followed by a blackish, less cinereous shade; exterior line black, indistinct, preceded by a cinereous shade line, twice angulate opposite the brown diffuse reniform spot; subterminal line distinct inferiorly only; a yellow brown shade along the costa of the posterior wings; the disk of the wings is occupied by

alternating cinereous and blackish shades, the former predominating ; one distinct black median line, preceded by a blackish shade. Beneath uniform cinereous gray, discal dots not prominent.

Hab. Massachusetts.

The beautiful cinereous and black coloration of this fine species will at once separate it.

NOTES ON THE LIFE HISTORY OF THE AMERICAN TIGER MOTH.

BY ROBERT BUNKER, ROCHESTER, N.Y.

Arctia Americana.

Egg spherical, .04 inch in diameter, honey yellow, shiny and smooth as polished glass ; laid in straight rows. Larva, when first hatched, one-eighth of an inch long, head small and black, body dark brown clothed with ten longitudinal rows of bunches of spreading hairs ; dark brown on the sides, dark gray on the back. First moult somewhat increased in size, color unchanged. Second moult ⅜ inch long, dark sooty brown ; hair dark brown on the sides, grayish brown above. Third moult ¾ inch long ; hair on the sides and fore part above, reddish brown ; light gray on the back.

Hybernated Sept. 16th. June 1st, 1875, fourth moult ; 1¼ inches long ; body blackish brown, sides and fore part above clothed with ochre yellow, back with long bluish gray hairs. Fifth moult—body two inches long, velvety black, ornamented above with four rows of very long bluish gray hairs (directed backwards) ; in front and on the sides with dark yellowish-red hair, except the third row, which is made up of about equal parts of red and gray hairs ; hairs immediately back of the head short and directed forward. Spiracles yellowish white, with a waxy lustre. Feet dark, snuff brown.

Cocoon thin and loosely put together, with hair from the body woven in.

Three specimens of this rare species were captured here last season. The one that came into my possession was brought by a friend, and laid about fifty eggs while in the box. With all the care I could bestow upon them only two reached maturity. A large majority perished during hybernation. Several sickened and died after the last moult; probably in a state of nature not more than two per cent would reach the imago state.

NOTES ON BUTTERFLIES.

BY W. H. EDWARDS, COALBURGH, W. VA.

I am able to complete the history of *M. phaeton*, part of which I communicated to the CAN. ENT. in Jan'y, 1869, vol. 1, p. 59.

The eggs are laid in large clusters of from 200 to 400 each, upon the under side of leaves of *Chelone glabra*. They are sub-conical, truncated, ribbed on upper half, yellow when laid, but soon turn to crimson. In 19 or 20 days, as Mr. Scudder informs me, they hatch. As the eggs found by me (13th June) had been deposited some days, I could not verify that point. The young larvae at once begin to construct a web, usually on the topmost leaves of the stem, and feed on the green leaves enclosed; as these are consumed, the web is extended down the stem, covering fresh leaves. The first moult takes place at six days, and the second at about the same time from the first. The third at a further interval of nine to ten days. Between the first and third the larvæ live much outside of the web, but the moult takes place within. Before the third moult a substantial web is constructed, and after the larvae have passed this moult, they become lethargic, and so remain till early the following spring. This period of lethargy commences, at this place, about the 15th of July. The web last constructed is often upon a different plant from that on which the larvæ feed, and in nearly all cases is supported by adjoining stems being incorporated.

With the first warm days of April the larvæ leave the web and scatter about the swamp in search of the young stems of *Chelone*. They moult twice and reach maturity about the 5th of May. The chrysalis period is

from 14 to 18 days. I have found no evidence that these larvæ feed on any other plant than *Chelone glabra*, though, as I have said, the webs are built on other plants.

Phyciodes nycteis Doubleday.

I have sometimes confounded this species with *P. Harrisii*, and I see that in vol. iv, CAN. ENT., p. 237, I made this error. The larvæ of *nycteis* feed on *Actinomeris squarrosa*, as was correctly stated by me in vol. v, p. 224. I then described the fall brood of *nycteis*, all of which hybernated after the third moult, and revived the following spring. This season I have raised an early brood from the eggs, and about one-third of the larvæ went on to chrysalis, while the remainder became lethargic after the third moult.

The chrysalis of this species varies much. Some are light-coloured, nearly white, with delicate blackish spots and fine streaks of brown over the surface; others are almost wholly black, while others again are between the two extremes. The length of the chrysalis is one-half inch, and the shape very nearly that of *phaeton*.

Argynnis idalia.

Mr. G. M. Dodge sent me last fall, from Nebraska, several eggs of this species, and I succeeded in carrying a few of the larvae through the winter, and one of them past the fifth moult, but this one died before chrysalis. The eggs are congeneric in shape with those of *cybele*, *aphrodite* and *diana*, and the larvae are of the same character as in those species. In the first two stages the larvae, indeed, are scarcely distinguishable in any respect from those of *diana*. After this, instead of the color being black or brown, as in the three species named, they are prettily ornamented with light stripes; but the spines and the arrangement of them are just as in the others. The food plant was common violet, or cultivated violets or pansies, indifferently. I raised quite a number of larvae of *cybele* last winter, and with perfect success. Instead of enclosing them in glasses, a process which proved disastrous to the *Argynnis* larvae which I attempted to raise in '73–'74, I covered the plants with wire gauze cylinders. These admitted plenty of air, and I had only to see that fresh leaves were supplied.

LIST OF NEUROPTERA COLLECTED CHIEFLY IN THE NEIGHBOURHOOD OF LONDON, ONT.

BY THE EDITOR.

All the species named below have been submitted to Dr. H. Hagen, of Cambridge, Mass., to whose kindness we are indebted for the determination of most of them.

PERLINA.

Perla rapinsularis.
" species undetermined.
Chloroperla bilineata.
Taeniopteryx maura ?

EPHEMERINA.

Ephemera natata ; very common.
Potamanthus cupidus; not uncommon.
Hexagina bilineata.

AGRIONINA.

Calopteryx maculata ; common about damp woods in the neighbourhood of small streams.
Lestes disjuncta ? ; not uncommon.
Agrion irene ; common.

GOMPHINA.

Ophiogomphus rupinsularis ; not common.
Gomphus spicatus ; not common.
Cordulegaster maculatus.

AESCHINA.

Aeschna constricta.
" verticalis.
" vinosa.

LIBELLULINA.

Celithemis eliza ; rare.
Plathemis trimaculata ; common.
Libellula quadrimaculata ; rare.
" exusta ; rare.
" pulchella.
" basalis ; rare.
" julia.

Leucorhinia frigida ; not common.
" intacta ; not common.
Diplax obtrusa ; common.
" vicina ; not uncommon.
" scotica.
Nannophya bella ; common.

SIALINA.

Sialis infumata.
Chauliodes pectinicornis ; not uncommon.
" serricornis ; rare.
Corydalis cornuta ; not uncommon.

HEMEROBINA.

Hemerobius tutatrix.
" simulans.
Polystoechotes punctatus ; very common.
Chrysopa oculata.
" externa ?

PHRYGANINA.

Neuronia ocelligera ; not common.
" postica ; not common.
Limnophilus stigma.
Setodes ; spec. und.
Hydropsyche scalaris ?

In addition to the above, Dr. Hagen has kindly supplied us with the following list of species found in Canada.

Ophiogomphus colubrinus ; Quebec.
Gomphus parvulus ; Nova Scotia.
Hagenius brevistylus ; Ottawa.
Cordulegaster Sayi ; Quebec.
Aeschna septentrionalis ; Nova Scotia.
Epophthalmia tenebrosa ; Nova Scotia.
" elongata ; Nova Scotia.
" torripata ; Nova Scotia.
Cordulia libera ; Canada.
" Shurtleffii ; Nova Scotia.
" spinigera ; Canada.
" semiaguea ; Nova Scotia.

Leucorhinia Hudsonica; New Brunswick.

Aeschna constricta, recorded in the Ontario list, is also found in Nova Scotia.

The above brief list of 43 species from Ontario and 13 from other portions of Canada, embraces, we believe, all that are known to occur in our Dominion. In view of the great number of insects belonging to this interesting order which occur throughout Canada, we hope that some of our collectors will devote a portion of their leisure moments towards more thoroughly working up this long neglected order of insects.

DESCRIPTION OF PACHNOBIA ORILLIANA.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

Both sexes of a species of *Pachnobia* have been collected by Mr. Geo. Norman, at Orillia, which I propose to call by the name of *orilliana*. It is evidently allied to *Agrotis hyperborea*, which I know only from Milliére's and Herrich-Schaeffer's illustrations. It looks at first sight like a species of *Graphiphora (Taeniocampa)*.

All the tibiae are spinose. The head is sunken, eyes naked, abdomen short. The wings are wide, the male antennae shortly pectinate, setose. The color is not unlike that of *Graph. incerta*, but more olivaceous. There is no basal dash. The color is paler, carneous gray, like the thorax, to the angulated median shade, beyond which the median space is olivaceous brown. The orbicular is large, spherical, concolorous, with a central brown dot and a brown ring. The claviform is suffused with deep brown, prominent, attaining the median shade. The reniform lies in the deeper color of the median space posteriorly, concolorous, kidney-shaped, darker stained inferiorly, well sized. The t. a. line is outwardly oblique, thrice waved, brown. The t. p. line is obsoletely geminate, the pale interior shade showing, of the usual shape, succeeded by a pale shading on the subterminal space which intrudes on the deep brown ground color outwardly like a finger below costal region. The deep brown color of the s. t. space shows the costal dots plainly and extends downwardly narrowly within and along the s. t. line, outside of the pale

shade which follows the t. p. line. S. t. line whitish gray, broad, distinct, with a subcostal dentation else continuous and even. Terminal space blackish; broken black points indicate the terminal line. Fringes reddish brown. All the veins marked by blackish scales, and there is a blackish shading over the median space anteriorly, below median vein and on the inferior portion of the basal field. The male has the lines and spots less obvious and the shading of the wing more strongly contrasts. Hind wings with reddish brown fringes, shaded with fuscous and with a blackish exterior shade and faint median line. Beneath the wings are irrorate with rufous: on both pair the terminal spaces are contrasted by a whitish coloring. A common subterminal shade and exterior line; discal marks linear, luniform. Beneath the vestiture is reddish brown, as are the sides of the palpi; above, with the front, these latter are pale. *Expanse* 35 m. m.

In the male the conformation of the subterminal pale shading is indistinct; the blackish shading basally on interior margin is restricted, the claviform is shorter, not attaining the median shade; the dark olive brown tint of the s. t. space forms a spot along the s. t. line opposite the cell. In this species the form of the thorax, which is darker colored posteriorly, recalls that in *Lithophane*.

Lederer only gives armature to the middle and hind tibiae in his diagnosis of *Pachnobia*. *P. carnea*, the type, has all the tibiae spinose; so has *Pachn. scropulana* (*Agrotis scropulana* Morr.) The species have the habitus of *Graphiphora* (*Taeniocampa*). I find that none of the characters given by Mr. Morrison in a recent number of *Psyche*, to distinguish his *Agrotis scropulana*, are valid, except that of the basal markings of the primaries, to which I am the first to draw attention. I am therefore still of the opinion that it is not certain that the White Mountain species is really different. I have recently re-examined my type of *Matuta Catharina*. I believe it to be a female; the simple antennae may not distinguish it from *Pachnobia* in this event, but it is different by the unarmed fore tibiae. It has a resemblance to *Pachn. orilliana* in habit and the black stains on the veins. Our North American species of *Pachnobia* will be as follows:

Cornuta Grote,
Scropulana (Morr.)
(An spec. seq. ?)
Carnea (Thunb.)
Orilliana Grote.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. vii, p. 113.)

COLEOPTERA.

By an unfortunate oversight, descriptions of the following Coleoptera have been ommitted. They should have preceded the family Cleridae on p. 109 of the present volume. In the reprint which we are preparing they will appear in their proper place.—Ed. C. E.

[240.] FAMILY DIRCÆIDÆ.

326. Xylita buprestoides *Payk.*—Length of body 3 lines. Taken in Canada by Dr. Bigsby.

Body narrow, black-brown, very minutely and thickly punctured, sprinkled with short decumbent pale hairs, not glossy. Head inserted ; eyes hemispherical ; palpi rufous ; antennae nearly as long as the prothorax, ferruginous, a little embrowned at the apex ; prothorax not wider than long, anteriorly narrowest, posteriorly obsoletely trilobed ; sides rounded ; scutellum transverse ; elytra very little wider than the prothorax ; tarsi ferruginous.

[Taken by Agassiz's Expedition to Lake Superior.]

FAMILY ANTHICIDAE.

327. Notoxus monodon *Fabr.*—Length of body 1⅔ line. A single specimen taken in Lat. 65°.

[241.] Body hairy with pale hairs. Head blackish ; mouth, palpi, and antennae testaceous ; prothorax testaceous ; horn convex above, margin denticulated ; elytra testaceous with a blackish band near the apex which rises upwards at the suture, and three blackish spots ; two at the base, and one between the band and the apex, the last very faint ; legs testaceous ; postpectus and base of the abdomen embrowned ; the remainder of the prone part of the body is testaceous.

[Not uncommon in Canada. Described and figured by Say (Am. Ent., i, 21, plate 10).]

FAMILY CANTHARIDAE.

328. CANTHARIS UNICOLOR *Kirby*.—Length of body 7 lines. Taken in Canada by Dr. Bigsby.

Body black, hoary from numerous decumbent white hairs; antennae subsetaceous, a little longer than the prothorax; two first joints very long, the first curved and nearly twice the length of the second; and the second as long as the three following ones together: prothorax rather bell-shaped, channelled; wings embrowned.

[Belongs to the genus *Epicauta* Red.]

[242.] 329. MELOE IMPRESSA *Kirby*.—Length of body 5¼ lines. A single specimen taken in Lat. 65°.

Nearly related to *Meloe violacea*, but very much smaller. Body violet-coloured. Head with scattered but not large punctures; front between the antennae transversely and obtusely elevated; antennae irregular; prothorax not much narrower than the head, anteriorly rounded, posteriorly narrower and emarginate, towards the base with a deepish impression, with several scattered but not large punctures, and two little transverse oblique crescents formed of punctures; elytra wrinkled; outer claws and spurs rufo-piceous, inner claws paler.

330. MELOE NIGRA *Kirby*.—Length of body 6 lines. A single specimen taken in Lat. 65°.

Extremely similar to the preceding species, but the body is all black with no tint of violet, except the base of the antennae below the band and the tibiae and tarsi; the head and prothorax are more thickly punctured, and the claws and spurs are ferruginous.

[Previously described as *M. conferta* Say.]

[243.] FAMILY MELYRIDÆ.

331. DASYTES FOVEICOLLIS *Kirby*.—Length of body 2¾ lines. A single specimen taken in the Journey from New York to Cumberland-house.

Body somewhat hairy, underneath black and glossy; above with a blue tint. Head glossy, punctured with largish scattered punctures; front with two impressions; prothorax nearly square, with the sides a little curved, punctured at the head, with a pair of transverse anterior impres-

sions ; sides and base margined, margin reflexed ; elytra less glossy than the rest of the body, minutely, but not conspicuously, punctured.

[Belongs to the family *Malachiidæ*.]

[254.] V.—HYMENOPTERA.

FAMILY CIMBICIDÆ.

351. CIMBEX FEMORATA *Linn.*—Length of body 10 lines ; expansion of wings 21 lines. A single specimen taken in Lat. 65°.

♀. Body very black, hairy. Antennæ yellow, brown at the base ; legs blue-black ; tarsi yellow ; wings hyaline with yellow nervures, brown at the tip, with a brown cloud in the middle areolet adjoining the costa.

352. TRICHIOSOMA TRIANGULUM *Kirby.*—Length of body 9 lines. A single specimen taken in Lat. 65°. Another was also sent me from Canada by Dr. Bigsby.

[255.] Body black, shining, covered with soft and woolly whitish hairs, punctured more or less. Head, excluding the mandibles, depressed, orbicular, as wide as the trunk ; mandibles crossed, very sharp, black ; upper lip subpentagonal, flat with a longitudinal elevation in the middle, hairs on this part black ; anterior margin of the nose wavy, emarginate in the middle ; antennae with the fourth, fifth, and sixth joints testaceous ; three eyelets behind the antennae arranged in a triangle ; eyes oval, prominent ; vertex square, marked out by a ridge on each side ; trunk subglobose ; prothorax with a longitudinal furrow ; thighs and coxae black-blue ; under a strong magnifier beautifully and most minutely reticulated, which gives them a silky lustre ; the rest of the leg is testaceous ; the two posterior pair of thighs are thicker than the others and armed at the apex with a short tooth on each side, between which is a cavity to receive the shank when folded ; tarsi with a sucker underneath at the apex of the four first joints ; wings testaceous with piceous nervures, and a cloud at the tip ; abdomen ferruginous with a dorsa triangular black spot, extending from the base towards the apex, but not entering the last segment ; the basilar ventral segments are spotted with brown.

[Found in Canada and Colorado.]

353. TRICHIOSOMA LUCORUM *Linn.*—Length of body 7 lines ; expansion of wings 15 lines. A single specimen taken in Lat. 65°.

Body black with a very slight æneous tint; glossy, hairy with cinerascent hairs, those of the trunk long. Head orbicular, scarcely so wide as the trunk: upper lip small, convex, orbicular, punctured; antennae black; wings subhyaline with a cloud at the tip; nervures some piceous and others rufous; thighs black with a very slight tint of blue; posterior pair armed with a tooth; abdomen short, subovate, black, covered more or less with short decumbent down; black above, underneath reddish at the tail.

[256.] FAMILY TENTHREDINIDÆ.

354. ALLANTUS LEUCOSTOMA *Kirby*.—Length of body 6 lines. One specimen taken in Lat. 65°.

Body narrow, black, glossy, without hairs. Head scarcely so wide as the trunk, wedge-shaped; palpi, suborbicular upper lip, emarginate nose, and base of the mandibles, white; apex of the latter rufous; antennae a little shorter than the trunk, nine-jointed, with the third joint longer than any of the others; neck constricted; tegulae testaceous; wings subhyaline with piceous nervures; legs yellow, with the apex of the tibiae and the whole of the tarsi of the posterior legs, black; abdomen linear, acute at the anus.

This species comes near *Allantus ater*, but the mandibles are rufous at the apex; the palpi are whiter; and the legs of a different colour.

FAMILY SIRICIDÆ.

355. SIREX BIZONATUS *Stephens*.—Length of body 18 lines; expansion of wings 27 lines. Taken in Lat. 65° and in the journey from New York.

[257.] Body very black, covered with innumerable punctures from each of which proceeds a black upright hair. Head narrower than the trunk; mandibles incumbent; palpi rufo-piceous; antennae as long as the trunk, yellow; behind each eye is a large oval yellow eye-like spot perfectly naked and smooth; legs and tips of the thighs yellow; wings yellowish with dark nervures; abdomen with the second, seventh and eighth segments luteous; anal mucro linear, yellow, terminating in a point; ovipositor black.

The specimens of this species, which Mr. Stephens found near London, might probably have been imported in fir timber from Canada.

DESCRIPTION OF A NEW SPECIES OF ANNAPHILA FROM CALIFORNIA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Annaphila immerens, n. s.

This is perhaps the slightest species of the genus yet known.

The blackish gray fore wings show the median line distinctly ; the t. p. line is incepted nearer the apex than usual, denticulate, slightly rounded opposite the cell, and unusually strongly inflected below the black mark, which denotes the reniform spot. The orbicular is a black dot. The t. p. line is bordered outwardly with a pale shade. Hind wings deep orange yellow, without dot or median line ; the latter obsoletely indicated at internal margin. A very narrow terminal black line, inwardly dentate above submedian fold ; fringes fuscous. Beneath orange yellow, immaculate, with narrow even blackish edging and fuscous fringes. On primaries costal traces of a transverse line. Body blackish fuscous.

Exp. 20 m. m. *Hab.* California.

BOOK NOTICES.

The Butterflies of North America, by W. H. Edwards, second series, part 3.

The third part of the second series of this superb work has reached us since our last issue. It contains five magnificent plates, figuring *Papilio zoliacon, Argynnis Meadii, Apatura celtis*, with drawings of the egg and of the larva in its various stages ; *Chionobas gigas* and *Californica*, and *Lycæna regia* and *heteronea*, with accompanying descriptions and much interesting information regarding the habits of the species.

Description of a new Crustacean from the Water Lime Group at Buffalo, by Aug. R. Grote and W. H. Pitt.

We have received advanced sheets of this paper, accompanied by an excellent photograph of the interesting object of which it treats. Both will appear in No. 1, Vol. 3 of the Bulletin of the Buffalo Society of Natural Sciences.

The Canadian Entomologist.

VOL. VII. LONDON, ONT., SEPTEMBER, 1875. No. 9

NOTES UPON SOME BUTTERFLY EGGS AND LARVÆ.

BY THEODORE L. MEAD, NEW YORK.

During the past month (July) I have endeavored to obtain the eggs and larvæ of some of the butterflies common near this place (Hunter), in the Catskill Mountains, and have met with considerable success.

The most interesting discovery was that of the food plant of *Phyciodes tharos*, which had baffled all my endeavors for the past four or five years, during which time Mr. Edwards and myself have tried a great number of plants without avail.

Once, indeed, as has been recorded in a previous volume, we obtained a number of eggs from females enclosed in a glass jar with grass, but the larvæ refused to feed and died.

This summer, remembering that the congeneric *nycteis* and *Harrisii* feed on Compositæ, I prepared a large box by partly filling it with earth and transplanting into this small specimens of all the common Compositæ I could lay my hands upon. The box was covered with gauze and about a dozen ♀ *Phyciodes marcia* and *tharos* introduced. In a few days I examined the leaves and found six patches of eggs upon one of the plants, the number of eggs in a patch varying from twenty to about one hundred and fifty. The plant proved to be a species of Aster, very common here in wet places and by the roadside; no specimens are in bloom as yet (Aug. 2nd), but from the leaves I think it will prove to be *Aster Novæ-Angliæ*. No eggs were found on any of the other plants. After finding these, I transferred the females of *marcia* which still remained alive to a smaller box with living food-plants; these have now laid several more large patches of eggs.

On the 31st of July I succeeded in finding a brood of young caterpillars upon a plant of this Aster growing in a damp meadow. The larvæ feed upon the under side of the leaf in the same way as those of *nycteis*, leaving the upper surface untouched. Those of the first moult

are merely hairy, in the second moult the spines are already distinctly seen. Around one cluster of the larvæ a green spider had drawn his net and taken up his abode among them, no doubt finding it very convenient to have his prey within such easy reach. Probably the ravages of spiders are more destructive to this species than almost any other cause, since the eggs are deposited near the ground, in places where spiders are always very numerous.

Mr. Edwards also has females of *Ph. marcia* set for eggs, and hopes to determine the relationship, if any, between this species and *tharos*.

In obtaining eggs of *Limenitis arthemis* I have also been very successful, partly, I think, on account of a method of keeping the parent butterflies in good health and spirits, devised some years ago, and which has given very satisfactory results.

A notch is cut in the side of any empty wooden box, through which a branch of willow or other appropriate food-plant is passed, care being taken to select a leafy spray so as to partially fill the box with foliage; it is then covered with gauze, tacked fast on one side and part way on the adjoining sides, that on the fourth side being held down by a piece of wood fastened to the remaining flap of gauze. This renders easy the examination of the contents at any time. Now a saucer of raw dried apples, sugared and partly filled with water, is put in and the cage is complete. Butterflies like *L. arthemis* will live in such a vivarium for two weeks and more after their capture, and appear to enjoy the food provided immensely, laying many more eggs than if enclosed in a bag and allowed to perish of hunger and thirst.

I have often captured specimens and dropped them in upon the pile of dried apples; instead of fluttering about and endeavoring to escape, they instantly unrolled their tongues and feasted for several minutes upon the repast prepared for them, without a motion of the wings.

So far, my fifteen females of *L. arthemis* have laid a very large number of eggs, probably over five hundred, and many of them are still alive. The butterflies at first observe their usual custom of depositing the eggs upon the tips of the leaves, but become reckless after a while and lay them anywhere. I counted considerably over one hundred upon the cloth covering the box.

I had the rare good fortune to catch also a female of *L. proserpina*, which has laid 31 eggs.

By next summer Mr. Edwards and myself hope to settle the question as to the dimorphism of *L. arthemis*, by rearing the caterpillars from these eggs; as about one-twentieth of the specimens seen are *proserpina*, if we are reasonably successful in carrying them through the winter, we are sure to obtain both forms from each kind of parent, if this is really a case of dimorphism.

Two years ago I captured a specimen here, intermediate in marking between *arthemis* and *proserpina*, and this year I have taken another, but these varieties are exceedingly rare.

The period between the laying and hatching of the egg is about seven days; the young larva, as has been observed with other species of *Limenitis*, makes its way to the tip of the leaf and there eats on both sides of the midrib, usually resting on the projecting end of this. On my box I notice that where two larvæ are hatched upon one leaf, the second comer constructs a narrow perch for himself from the side of the leaf, and rests upon it. These perches are nearly a quarter of an inch long and about one-fiftieth of an inch in diameter; they are irregularly cylindrical, and composed of frass and small bits of the leaf, fastened together and covered with grayish silk.

Besides these eggs I have many of *Satyrus nephele*, and obtained a few of a small species of *Nisoniades*. The parent was too much battered and broken to be surely identified, but I believe it to be *lucilius*. The eggs were deposited on willow; they are oval and have ten strongly projecting upright ribs, these and the space between them being marked with transverse raised lines. In color the eggs are yellow, soon changing to claret-red. The young larva, soon after hatching, eats a narrow slit from the edge of the leaf inward, soon turning at an angle, and then the flap of leaf is bent over and fastened with silken cables so as to afford shelter to the caterpillar. I have sometimes found, in previous seasons, half grown larvæ of some Hesperian on the poplars and willows here, hiding between two leaves lightly fastened together, and probably this is the habit of the species in question as it grows up.

———:o:———

PIERIS RAPÆ.—This troublesome pest to the cabbage grower is rapidly spreading westward. During the past month (August) it has appeared in considerable numbers in this neighbourhood (London, Ont.,) and is fast becoming one of our commonest butterflies. Already reports are coming in from all quarters of damage done by the larvae. We hope its little parasite, *Pteromalus puparum*, will soon follow in its wake.—ED. C. E.

THE EFFECT OF THE GLACIAL EPOCH UPON THE DISTRIBUTION OF INSECTS IN NORTH AMERICA.

BY AUG. R. GROTE, A. M.

(Read before the American Association for the Advancement of Science, at Detroit, Aug. 10th.)

From the condition of an hypothesis the glacial epoch has been elevated into that of a theory by the explanations it has afforded to a certain class of geological phenomena. The present paper endeavors to show that certain zoological facts are consistent with the presence, during past times, of a vast progressive field of ice, which, in its movement from north to south, gradually extended over large portions of the North American continent. These facts, in the present instance, are furnished by a study of our Lepidoptera, or certain kinds of butterflies and moths now inhabiting the United States and adjacent territories. Before proceeding with the subject, a brief statement of phenomena, assumed to have attended the advent of the glacial epoch, is necessary.

At the close of the Tertiary, the temperature of the earth's surface underwent a gradual change by a continuous loss of heat. The winters became longer, the summers shorter. The tops of granitic mountains in the east and west of the North American continent, now in summer time bare of snow and harboring a scanty flora and fauna, became, summer and winter, covered with congealed deposits. In time the mountain snows consolidated into glacial ice, which flowed down the ravines into the valleys. Meanwhile the northern regions of the continent, which may have inaugurated, submitted extendedly to the same phenomena. Glacial ice, first made on elevations, finally formed at, and poured over, lower levels. Glacial streams finally united to form an icy sea, whose frozen waters slowly plowed the surface of the rocks, and whose waves, in their movement from north to south, absorbed the local glacial streams in their course, and extended over all physical barriers into the Southern States and down the valley of the Mississippi. Before this frozen deluge the animals must always have retreated. The existing insects of the Pliocene must, in submitting to the change of climate which accompanied the advance of the glacier, have quitted their haunts with reluctance, and undergone a severe struggle for existence, no matter how gradually they

had been prepared for the encounter. We may expect that multitudes of specific forms ultimately perished, of whose remains no traces have been preserved.

Such being a brief statement of the outlines of the opening of the glacial epoch, we turn to some facts offered by a study of certain of our existing species of butterflies and moths.

The tops of the White Mountains and the ranges of mountain elevations in Colorado, offer us particular kinds of insects, living in an isolated manner at the present day and confined to their respective localities. In order to find insects like them we have to explore the plains of Labrador and the northern portion of the North American continent, in regions offering analogous conditions of climate to those obtaining on the summits of these mountains. The genera *Oeneis* and *Brenthis* among the Butterflies, and *Anarta* and *Agrotis* among the Moths are represented by the same or similar species in all of the above mentioned localities. In the case of the White Mountain butterfly, *Oeneis semidea*, we have a form sustaining itself on a very limited Alpine area on the top of Mount Washington.* Although there is some doubt that precisely the same form of *Oeneis* has been discovered in Colorado, the fact remains that *Oeneis* butterflies exceedingly like it, though registered by us under different specific names, live in Labrador and Colorado. Whether the White Mountain butterfly, *Oeneis semidea*, be, as suspected by Lederer, a modification of some of the Labradorian forms of the genus, or not, the geographical distribution which its genus enjoys cannot be meaningless. The question comes up, with regard to the White Mountain butterfly, as to the manner in which this species of *Oeneis* attained its present restricted geographical area—How did the White Mountain butterfly get up the White Mountains? And it is this question that I am disposed to answer by the action attendant on the decline of the glacial epoch.

I have before briefly outlined the phenomena attendant on the advance of the ice-sheet, and I now dwell for a moment on the action which must equally be presumed to have accompanied its retirement. Many of the

* See Mr. Scudder's article in the "Geology of New Hampshire," 1, 342. Mr. Scudder first pointed out the existence of Alpine and sub-Alpine faunal belts on Mount Washington, and interestingly remarks, "that if the summit of Mount Washington were somewhat less than two thousand feet higher, it would reach the limit of perpetual snow."

features of its advance were repeated, in reverse order, on the subsidence of the main ice-sheet or glacial sea. The local glaciers appeared again, separate from the main body of ice, and filled the valleys and the mountain ravines, thus running at variance with the main body of the glacier, being determined by local topography. A reversal of the temperature shortened the winters and lengthened the summers. Ice-loving insects, such as our White Mountain butterfly, hung on the outskirts of the main ice-sheet, where they found their fitting conditions of temperature and food. The main ice-sheet had pushed them insensibly before it, and during the continuance of the glacial epoch, the geographical distribution of the genus *Oeneis* had been changed from a high northern region to one which may well have included portions of the Southern States. And, on its decline, the ice-sheet drew them back again after itself by easy stages; yet not all of them. Some of these butterflies strayed by the way, delayed by the physical nature of the country and destined to plant colonies apart from their companions. When the main ice-sheet left the foot of the White Mountains, on its long march back to the pole, where it now seems to rest, some of these wayward, flitting, *Oeneis* butterflies were left behind. These had strayed up behind the *local* glaciers on Mount Washington and so became separate from the main body of their companions, which latter journeyed northward, following the course of the retirement of the main ice-sheet. They had found in elevation their congenial climate, and they have followed this gradually to the top of the mountain, which they have now attained and from which they cannot now retreat. Far off in Labrador the descendants of their ancestral companions fly over wide stretches of country, while they appear to be in prison on the top of a mountain. I conceive that in this way the mountains may generally have secured their alpine animals. The glacial epoch cannot strictly be said to have expired. It exists even now for high levels above the sea, while the Esquimaux finds it yet enduring in the far north. Had other conditions been favorable, we might now find Arctic man living on snow-capped mountains within the Temperate zone.

At a height of from 5,600 to 6,200 feet above the level of the sea, and a mean temperature of about 48 degrees during a short summer, the White Mountain butterflies (*Oeneis semidea*) yet enjoy a climate like that of Labrador within the limits of New Hampshire. And in the case of the moths an analogous state of things exists. The species *Anarta melanopa* is found on Mount Washington, the Rocky Mountains and Labrador. *Agrotis islandica* is found in Iceland, Labrador, the White Mountains, and, per-

haps, in Colorado. As on islands in the air, these insects have been left by the retiring of the ice-flood during the opening of the Quarternary.

On inferior elevations, as on Mount Katahdin, in Maine, where we now find no *Oeneis* butterflies, these may formerly have existed, succumbing to a climate gradually increasing in warmth from which they had no escape; while the original colonization, in the several instances, must have always greatly depended upon local topography.

In conclusion, I have briefly endeavored to show, that the present distribution of certain insects may have been brought about by the phenomena attendant on the glacial epoch. The discussion of matters connected with this theoretic period of the earth's history still, as it now appears, brings out more and more clearly the conception of its actuality. I hope that my present statements may draw the attention of our zoologists more to the matter, seeing that we have in our own country fields for its full exploration. And I permit myself to entertain the belief that testimony as to the former existence of a long and widely spread winter of the years, is offered in evidence through the frail, brown, *Oeneis* butterflies that live on the tops of the mountains.

METHODS OF SUBDUING INSECTS INJURIOUS TO AGRICULTURE.

BY JOHN L. LECONTE, M. D., PHILADELPHIA.

(Read before the American Association for the Advancement of Science, at Detroit, Aug. 10th.)

In accordance with the predictions made at the time of its first appearance in the immediate Mississippi Valley, the Colorado potato beetle continues to extend its area of distribution. It has during the last and present seasons reached the Atlantic coast of the Middle States, and is preparing an invasion in mass of the maritime parts of New England, which will soon be overrun with the same ease with which it has conquered the Western and Middle States. Meanwhile the farmers are anxiously inquiring for means of destroying the invader. Materials destructive to the insects and said not to be injurious to the plant or the soil, have been recommended almost without number; but with the

exception of Paris green, they have been either very insufficiently tried or found inoperative. That compound of arsenic and copper therefore remains naturally the favorite, notwithstanding its dangerous qualities and the possible deleterious effect it may produce on the fields after long use.

Entomologists and other scientific men are often asked: "Why do you not give us another remedy against this destructive insect? Are you baffled with all your boasted progress in learning by the invasion of a wretched little bug?" No, my friends, we are not baffled by the wretched little bug, but in our endeavors to teach you how to dispose of it in such a manner as to protect your crops, we are embarrassed by your own failure to grasp the magnitude of the problem which you have set us to solve. Had you indeed comprehended the warnings given by my lamented friend B. D. Walsh, on the first injurious appearance of the insect, and since repeated by many Entomologists, you would have insisted several years ago that the subject should be investigated with a power of inquiry proportioned to its importance, and you would have received such information as might with proper and well directed industry on your part have prevented much loss.

However, I do not wish now to speak of the past; it is gone and its errors cannot be undone. Let us rather enquire what shall be done in the future.

The first thing, then, is to cease calling upon science for a remedy, when science and empiricism have probably already given you many remedies, concerning the application of which I will have a word to say by-and-by. Science can help you and will help you only when you have begun to help yourselves. How, then, can we begin to help ourselves? I hear you ask. First, then, there should be a scientific commission, selected by competent scientific authority for their merit and not for their political influence. Politicians have had too much control over our agricultural interests, as you all have reason to remember with regret. This commission should be sufficiently large to subdivide the subjects committed to them in such manner as to thoroughly investigate the habits and times of appearance in different districts of the great agricultural pests, the effect upon them of all the cheaper materials which have been or may be judiciously suggested as destroying agents, and the proper times and manner of applying them. The members of the commission should also receive sufficient compensation to warrant them in giving as much time and labor to this investigation as may be required, even to the

temporary abandonment, if necessary, of their other scientific or secular pursuits. No such task can be properly performed and completed by the solitary labors of State entomologists underpaid and overburdened with work. Only by association of several such careful observers and investigators can a worthy, useful result be obtained for the suppression of several of the most formidable pests.

2. This information being procured, should be tabulated as far as possible, or at least reduced to a compact form for easy reference and widely published in newspapers and also in pamphlet form.

3. By the distribution of this information and by appeals through the newspapers and agricultural journals, as well as by addresses at meetings of farmers and others interested in agriculture, it must be impressed upon the public mind that all individual efforts for the suppression of these pests are frequently futile. Only combined and contemporaneous action over large tracts of country will be effective.

Now, while I am prepared to believe that when these facts are made known to the farmers they will immediately see the importance of the suggestion for unanimous and simultaneous advance upon the enemy, yet without legislative aid it will be quite impossible to secure the organization requisite for an effective onslaught. It will therefore be necessary for the citizens interested to command their representatives, either in State Legislatures or in National Congress, to prepare proper laws for the destruction of these pests at stated times, to be determined and recommended by the scientific commission. These laws will be not only cheerfully obeyed by every intelligent farmer, but I know that the farmers as a class will be glad to have such laws enacted and enforced with penalties for their neglect. Those disposed to help themselves and each other can only thus be protected against an ignorant or indolent neighbor, whose thriftlessness would otherwise make of his potato patch, his cotton field or his plum orchard a nuisance nursery from which no industry could protect the surrounding farms.

Thus, then, the organization necessary for a successful campaign against our insect enemies must be authoritatively demanded by you. Under less free forms of government the plan which I have suggested would probably have long ago been perfected by the rulers. Even the fear of the extension of the Colorado potato beetle to Europe has excited in several countries almost as much discussion and confusion of counsel as an apprehended revolution.

The fact is, that these incursions and ravages of hostile insects represent a condition of *war*. It is only by a quasi-military organization and appropriate weapons suited to the nature of the enemy that they can be conquered. Without recognition of this fact nothing can be done against them, and we must bow our heads and exclaim with the pious Mohammedan fatalist, "It is the will of God."

Three subjects yet remain to be considered—the materials to be used, the time of making the attack in force, and the weapons to be employed.

1. The materials may be either vegetable or mineral, or merely human labor intelligently and persistently applied. The latter is the only effective means of contending against some insects, but in all cases it is a necessary adjunct to the remedies used. These remedies are very numerous, and until a careful investigation is made of the large number already suggested, no proper indications can be given except that those least injurious to man should be preferred, even at greater cost of money and labor; and that those which kill the insect by contact with its body are likely to prove more effectual than those which destroy by poisoning its food. It may be here observed that the form of apparatus in these two cases must be quite different. In the latter, any contrivance which will sprinkle a fluid or dust a powder on the exposed or upper surface of the leaves will be sufficient; in the former, in which the poison kills by contact with the insect, it must be able to reach the enemy wherever sheltered.

2. The time of attack must naturally be when the enemy is least able to resist. To quote again from the excellent memoir of Motschulsky, "the most effective and at the same time the easiest mode of opposing the developement of the locusts is the crushing out of the young broods when collected in swarms in the place where they are hatched. Consequently the most important thing is to know the nesting place of these destructive pests. In order to discover them and to point out the course to be pursued * * it might be well to send skilful persons * * to make the necessary researches, and these, with the assistance of the local authorities, might seek out the places where the insects abound and establish the necessary regulations for their destruction." (l. c. p. 228.) In the case of the cotton moth it is plain that the attack should be made upon the earliest broods, which are said to appear in the extreme southern part of the country, and from which the migratory swarms which travel northward are supposed to be developed; also, that the attack must be directed against the caterpillars rather than the perfect insects.

The Colorado potato beetle may also be attacked with greatest success in the larval state. The integuments are then soft, and the appetite more voracious, so that whether the poison by contact or the poison by food be used, it will have a more certain effect than upon the perfect insect, which is protected against the former by the hard chitinous surface and against the latter by preoccupation in reproductive duties.

You will be prepared to admit the importance of the recommendation above made, that the times for making the attack should be directed by the scientific commission after full examination of the habits of the insects and the dates of their appearance in their various stages of developement. These dates will vary in different districts, and without a carefully tabulated calendar of the necessary facts, no system of combined effort, such as I believe to be essential, can be planned.

The apparatus to be used must of course vary greatly with the habits of the insects to be attacked. In the case of the plum curculio canvas frames propelled on a kind of wheelbarrow, with a ram to concuss the trunk of the tree, is probably the best instrument yet devised. The insect will fall into the net when the tree is struck, and may be easily destroyed when a sufficient mass has been collected. For the cotton moth and the potato beetle the apparatus for poisoning the leaves upon which they feed may be any simple sprinkler or dusting box, according as liquid or solid poison is employed. But for direct application to the insect itself, we must use means by which a fine spray will be driven with force sufficient to envelop the whole plant, or the surface of the ground upon which the insects are assembled, in a mist of poisonous liquid. Such an instrument is the atomizer, which has the additional advantage over the sprinkler that it consumes less liquid. The first application of the atomizer for the destruction of insects was made by me several years ago, and in the *American Naturalist* for August, 1869, I published a short paper recommending its use with certain poisonous liquids for the disinfection and preservation of insect cabinets. I have seen its frequent use with great success.

When the question of locusts became of importance last year, and the Colorado potato beetle began to be very troublesome in the Atlantic States, I spoke with several commercial friends and others about the propriety of making atomizers of large size for the destruction of these pests. In consequence of delay in the measures they thought necessary to command the attention and security of a manufacturer, no progress

has yet been made for introducing such a contrivance into general use. Meanwhile a small apparatus consisting of an atomizer, a tank of fluid supported on the back, and a pair of bellows fixed at the side of the operator, has been independently introduced by a manufacturing establishment in Philadelphia, and I have been told is somewhat of a favorite. It will doubtless be useful to a limited extent, and is not patented I believe.

For small arms, this or a somewhat larger and more complete instrument will answer, but in the war against insect pests in which I have endeavored to interest you, we must have heavy ordnance as well as weapons for hand use. Large compound atomizer tubes, with five, ten, twenty, or, in fact, an indefinite number of orifices for producing the spray, can be made, connected with large tanks of fluid and worked by a powerful current of air from a revolving fan, driven by man, horse or steam power, according to the size of the instrument. When of sufficiently large size, the machine can be mounted on wheels and transported wherever it would be required for use. Before such instruments as these an invading army of caterpillars, or even a recently hatched swarm of locusts, would be annihilated. A comparatively small number of men would be required to work a battery of this kind of field artillery, and it would be found immensely effective.

The organization recommended can be effected only by the strong appeal of the people where agricultural interests dominate, for proper instruction from the government and proper protection by legislative power. We have game laws to protect our useful wild animals; thistle laws to guard against extension of noxious weeds. Why not have insect laws for destruction of agricultural pests?

Farmers of the West, are you willing to exert yourselves to procure this result? The prize is a rich one—it is no less than immunity from an annual destruction of property quadruple or sextuple that of the great Chicago conflagration.

ON A CANADIAN SPECIES OF AGROTIS.

BY A. R. GROTE, BUFFALO, N. Y.

Mr. George Norman has sent me specimens of a species of *Agrotis* allied to *tessellata*, which were taken at Orillia. I propose to call the species *Agrotis versipellis*. The male antennae are brush-like, eyes naked,

all the tibiae spinose. The thorax and tegulae are dark brown; collar with a blackish shade in front, below which it is ashen. Head and tips of palpi grayish brown; 2nd palpal joint outwardly blackish. Fore wings blackish brown; lines geminate, distinct, with pale included shades. *Median vein narrowly striped with white.* A whitish shade over subcostal nervure. Claviform rather small, distinctly black-edged. Stigmata smaller than in *tessellata*, grayish brown, the cell between them, and before the ovate orbicular, blackish. Median space of a clearer brown below the median vein. Course of the median lines much like *tessellata*; the t. p. a little more exserted opposite the median nervules. Subterminal line a nearly straight gray shade, thus differing decidedly from *tessellata*. Hind wings blackish fuscous, a little paler at base, with paler fringes and reflection of the discal lunule from beneath, where both wings are blackish fuscous and show a faint common line. *Expanse* 30 m. m.

This is a handsome species and seems to be easily distinguished from its ally by the white median vein. It seems intermediate between *tessellata* and *Ridingsiana*.

I have been shown in Detroit, by Mr. J. A. Lintner and Mr. O. S. Westcott, specimens of an *Agrotis* new to me, but which I thought might prove the true *obeliscoides* of Gueneé, from my memory of his description. This is in so far interesting, as I have been disposed, in the absence of another species, to consider *servatilis* as the species intended by Gueneé.

ON CERTAIN SPECIES OF MOTHS FROM FLORIDA.

BY A. R. GROTE, BUFFALO, N. Y.

The following species were collected by Mr. Schwarz and Mr. Bela Hubbard, of the Detroit Scientific Association, among other most valuable scientific material, obtained during a recent visit to Florida.

Megathymus yuccae (Bdv. & Lec.) Scudd.

The eyes are large and naked; caputal squamation of mixed flattened scales and hair. I cannot find any ocelli. The cylindrical, scaled antennæ are capitate, without terminal inflection or hooklet. The tibiæ and tarsi are strongly spinose; hind and middle tibiæ with terminal claw. I regard the insect as belonging to the Castnians, where it is placed by Walker. The ornamentation mimics the Hesperians.

Haulover, Fla., March 8.

Aegeria floridensis, n. s.

♂. Seems to belong to a new structural group, for which I propose the name *Pyrrhotaenia*. The antennæ are heavy, lengthily pilose, brush-like. The naked eyes are banded black and golden, narrowed superiorly. The ocelli are large. The head is narrow, prominent; palpi curved, long, ascending, free from the front: maxillæ moderate. Anterior wings scaled, very narrow, widening terminally at outer third, blackish violaceous. The narrow portion of the wing is medially orange red, interrupted by the ground color at beyond the disc. Beyond the interruption the interspaces are orange red for a short space; the internal margin to terminal third is narrowly streaked with orange red. Beneath largely shaded with orange; the violaceous terminal portion of the wing interspaceally rayed with orange. Hind wings pellucid, with narrow orange costal border and blackish fringes. Head covered with broad blackish violaceous scales antennæ violaceous. Palpi and collar orange. Legs violaceous, marked with orange; hind tibiæ twice broadly banded with orange. Abdomen blackish cyaneous, with a concolorous terminal tuft containing a few white scales; two terminal segments banded with orange, fourth from the tip orange banded, this color extending beneath.

Expanse of fore wing, 6 m. m. *Total length of body*, 9 m. m.

Enterprise, Fla., May 29.

Cosmosoma omphale Hübn.

Haulover, Fla., March 9.

Syntomeida ipomaeae Harris.

The discal dot is sometimes obsolete on the fore wings above.

Enterprise, Fla., May 28.

Didasys, n. g.

A form allied to the Cuban *Burtia*. The abdomen in the male provided with two lateral, elongate, pilose, blackish terminal tufts, one on each side, arising from the genital pieces, which latter are prominent, exceeding the anus, when closed forming a whitish U beneath, from the color of the scales. The large ocelli are removed from the somewhat narrowed, naked eyes. The plumose ♂ antennæ are thickly furnished with lengthy setose pectinations. Palpi moderate, pointed, exceeding the front. Shape of the wings as is usual in the group. The median fold of *Cosmosoma* is absent.

Didasys Belae, n. s.

Vertex, collar, base of the primaries and palpi orange; terminal palpal joints blackish. Antennae black: legs blackish, streaked with whitish and with whitish fore coxæ. Abdomen above orange scarlet, terminal segments with short lateral fluffy tuftlets, the terminal ones touched with black. Thorax and patagia black, neatly lined with pale. Abdomen beneath orange at base, the terminal portion whitish with blackish incisures. Fore wings pellucid; veins black marked. A wide black terminal band enclosing a series of six interspaceal orange yellow spots, arranged subterminally in a series following the shape of the terminal margin. An orange yellow discal spot narrowly edged with black. Internal margin blackish, narrowly streaked with yellow. Hind wings pellucid, with black borders and the costal edge narrowly yellowish. Beneath as above, the spots of a paler orange. The ♀ has a dorsal row of abdominal black dots: anal segments terminally brownish; the dorsal abdominal markings are very slightly shown by the ♂ on close inspection.

♂, Cedar Keys, June 4, expands 26 m. m.; the two terminal tufts are 3 m. m. in length.

Dahana, n. g.*

A form between the clear-winged Glaucopid genera and *Ctenucha*. The narrow primaries are one-third longer than the entire body. Both pair of wings are closely scaled, cyaneous black terminally, but mostly dead black. Antennae long, plumosely pectinate in the male, serrate in the female. Abdomen rounded terminally, without anal tufts in the male, short in both sexes and plump. Ocelli near the margin of the narrowed naked eyes. Palpi exceeding the front.

Dahana atripennis, n. s.

Face mixed cyaneous and yellow; orbits of the eyes, palpi at base, sides of the thorax in front dark yellow; terminally the palpi are black. Thorax beneath cyaneous, brilliant; above black with yellow edges to the patagia at base and streaked with cyaneous. Abdomen brilliant blue laterally at base, else orange above in the male, yellow in the female. Fore wings dull black, slightly blue outwardly in male, with a yellow fleck above internal angle. Hind wings cyaneous black above, with short pale fringes. Beneath fore wings more blue at base, with the yellow streaky

* Sanskrit: the Dawn.

shade at internal margin more diffuse. Hind wings immaculate beneath. Abdomen dusky along the venter.

Length of primary 18, of the body 12 m. m.

Enterprise, Fla., May 28.

The male is the more gaily colored, and has the blue reflections more noticeable.

Hexeris enhydris, n. g. et sp.

♀. There are no ocelli, and thus there is a resemblance to the Geometridae in a form resembling the Fasciatae in the long labial palpi. The cut of the wings rather resembles *Endropia*. The labial palpi are extended straightly forwards for more than twice the length of the head. The palpi are divaricate, the third joint linear, elongate, more than half the length of the second. Antennae simple, comparatively short; the genus seems distantly related to *Syllectra*. Fore wings 12 veined, no accessory cell; veins 7, 8, 9, thrown off near together from the upper extremity of the cell; cell incompletely closed; 5 nearer to 4 than to 6; 8 to apex. The position of 5 seems to me decisive, and that we have to do with a Noctuid. Hind wings 8 veined, 3 and 4 from one joint, 5 near 4; cell closed by a fold or obsolete vein; 5 hardly weaker than the rest. The divided frenulum indicates the sex of the specimen. The frenulum seems to be homologous with the marginal or sixth principal vein of butterflies. Mr. Scudder has pointed out to me that this number is sometimes present in the higher groups. The frenulum cannot be considered a specialized hair. I have before come to the conclusion that it represents a missing vein; the reason for its complexity in the female I cannot yet suggest. In the new form the legs are slender, long and unarmed. The entire insect is pale ochreous, shaded with rusty, and in color and ornamentation resembles some of the Geometridae. The fore wings have common wavy rusty lines, and are mottled or subreticulate in appearance. A median line bent at the middle of the wing, where it unites with an outer line from the costa, and thus sketching the figure of a crooked Y, is noticeable. Beneath the same markings come out, the broader rusty lines of the upper surface being reproduced on a yellowish ground. Length of fore wing 17 m. m.

Two specimens collected at Fort Capron, Fla.; the largest is before me. I am much indebted to Mr. Geo. Dimmock for his preparation of the wings of the specimen by a valuable process discovered by him, an account of which was read before the American Association for the Advancement of Science.

MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

According to previous announcement, the first meeting of this club was held in the rooms of the Detroit Scientific Association, on the 10th of August, at 2 : 30 p. m., Dr. J. L. Leconte, President in the chair, Prof. C. V. Riley, Secretary. The attendance was large, including S. H. Scudder, Esq., Cambridge, Mass., Vice-President, and Messrs. A. R. Grote, Buffalo, N. Y., W. Saunders, London, Ont., B. P. Mann and E. P. Austin, of Cambridge, Mass., Prof. E. S. Morse, Salem, Mass., J. A. Lintner, Albany, N. Y., E. A. Schwarz, H. G. Hubbard and B. Walker, of Detroit, Dr. A. E. Dalrymple and Dr. J. G. Morris, Baltimore, Md., Prof. A. J. Cook, Lansing, Mich., Dr. Hoy, Racine, Wisconsin, Clinton Roosevelt and Geo. Dimmock, Springfield, Mass., B. D. Sanders, J. C. Holmes and Wm. Provis, Detroit, J. T. Ison, Cleveland, Ohio, and others.

President Leconte, in a few opening remarks, stated the objects had n view in the formation of this club. They were chiefly to cultivate closer personal relations among those interested in Entomological pursuits, many of whom were widely separated by distance, to exchange views and record observations, and to exhibit specimens of interest. He hoped that the meetings would not only be fruitful in these respects, but that, seeing the importance of Entomology in its relation to agriculture, some good to the country might flow from the deliberations.

Mr. Wm. Saunders mentioned the fact of the unusual scarcity of insects of the Saw-fly family (Tenthredinidæ) throughout western Ontario, especially those destructive to fruit, naming the Gooseberry Saw-fly *(Nematus ventricosus)* and the Pear Tree Slug *(Selandria cerasi)*. Both these insects, although enormously abundant and destructive in 1874, had been quite scarce in 1875. He called for suggestions as to the cause, his own impression being that this diminution had been caused by the severity of the late winter and spring.

Prof. Cook, of Lansing, Mich., had not observed any remarkable scarcity of these species in his neigborhood.

Prof. Riley had remarked their almost entire absence in some localities, and their comparative abundance in others.

Mr. A. R. Grote exhibited specimens of *Agrotis islandica* from the top of the White Mountains and from Labrador.

A lengthy discussion on nomenclature ensued, and was participated in by many of the members present, it being generally conceded that some action should be taken by the club, looking to the adoption of some rules or suggestions which might guide the Entomologists of the country on this perplexing question. On motion, Messrs. Scudder, Riley and Saunders were appointed a committee to take the matter of nomenclature into consideration and present it at a future meeting in such form as to offer opportunity for more definite discussion.

Mr. Scudder spoke favorably of *Psyche*, the organ of the Cambridge Entomological Club, and urged that members subscribe for it on account of its excellent bibliographical record.

Mr. Mann called attention to the difficulty of getting hold of State Reports, and thought there should be some system adopted by which these reports could be placed on sale, so that Entomologists who desired to do so might purchase them.

Mr. Saunders thought that if some plan couid be devised whereby the valuable facts and suggestions contained in these various reports could be brought together, condensed into one volume, and made available to agriculturists as well as entomologists, that much good would result from it.

The President suggested that such a work might well be done by the general government, and would be much more valuable than the volume it now sends out.

On motion, it was resolved that this club request the American Association for the Advancement of Science to take such action as seems best calculated to secure the placing of State Reports upon scientific subjects in the library of the Association. The Secretary was instructed to bring this subject before the Association.

Dr. Morris referred to the scarcity of Sphingidae about Baltimore during the present season, an experience which was corroborated by other members present. Mr. Austin had found all insects unusually scarce about the White Mountains, where he had been collecting for the past two years. Mr. Riley thought the very severe and late winter and the unusually rainy summer in part explained the fact.

Mr. Scudder offered some remarks on the great abundance of the Army Worm *(Leucania unipuncta)* in portions of Massachusetts, as an

exception to the general rule of scarcity of insect life; he had made a calculation from the number counted in a square foot, that in a field near Cambridge there must have been as many as two million worms to the acre. Other members offered similar experience in reference to this species. Mr. Riley stated that the Army Worm generally abounds during a very wet summer following a very dry year.

Mr. Lintner referred to the great scarcity of *Orgyia leucostigma* as in striking contrast to its abundance last year in Albany.

The election of officers then took place, resulting in the re-election of Dr. John L. Leconte as President, Samuel H. Scudder, Vice-President, and C. V. Riley, Secretary.

Mr. Riley read a paper on "Locusts as Food," in which he gave his own experience in cooking and eating them. On one occasion he ate nothing else for a whole day. He found them to have an agreeable nutty flavor, and especially recommended them deprived of their legs and wing cases, and fried in butter, and also spoke very highly of a soup made from them. He referred to John the Baptist, who had often been pitied for the scantiness of his fare, locusts and wild honey; Mr. Riley thought he had been well provided for. The writer regarded it as absurd that parties should actually die of starvation, as some had done in the districts where this locust plague had prevailed, while surrounded by such an abundance of nutritious and palatable food.

The meeting then adjourned, subject to the call of the President.

On Tuesday evening, the Cambridge Entomological Club held a meeting, when all interested in Entomology were invited to be present. W. Saunders, of London, Ont., was called to the chair. After the usual routine business had been disposed of, Mr. George Dimmock read a paper on the recent excursion of the Cambridge Club to the White Mountains, where the members had spent some two weeks in collecting. The experiences related were of a very interesting character, showing that the party, besides accomplishing much useful work, had thoroughly enjoyed their trip. Mr. Austin, who had been one of the party, exhibited a large collection of insects made during the past two years among the White Mountains, embracing many very interesting species, and offered some remarks on their habits.

Messrs. Cook, Lintner, Morris and Riley were elected members of the Club.

Mr. Grote presented some instructive facts in relation to the identity of some of the White Mountain moths with those of Labrador. Mr. Riley enquired whether many *Caloptenus* had been found on Mount Washington, and expressed the opinion that a race of *spretus* had been found there.

Mr. Saunders enquired of the Michigan friends whether *Pieris rapæ* had been found in the State. Prof. Cook stated that it had not yet appeared in Michigan; he remarked that *protodice* was much more numerous than *oleracea*. Mr. Riley stated that *protodice* was most abundant throughout Illinois and Missouri. Mr. Ison, of Cleveland, stated that *rapæ* appeared in his neighborhood for the first time last spring; at first it was found along the lake shore, but before the season closed it was abundant throughout the greater part of the district over which his observation had extended. Mr. Ison said that with them the larva seemed to prefer mignonette to cabbage. In reply to a question as to the correctness of the views advanced by some Entomologists in regard to the color of the imago being affected by this food plant, Mr. Lintner said that he had, from among 500 or 600 specimens fed on cabbage, found a number of the yellow variety. Mr. Riley stated that the larva of *protodice* was also partial to mignonette.

Danais archippus formed the next topic of discussion. Mr. Cook had found the larva this season peculiarly infested by several parasites. Mr. Riley had seen Tachina flies bred from *archippus*. Mr. Saunders had reared, on one occasion, a large number of small Hymenopterous parasites from a chrysalis. He also asked the members if any explanation could be given of the reason why this species assembled occasionally in immense swarms and migrated thus from place to place, and referred to instances of such swarming. Mr. Ison referred to an immense swarm which passed over Cleveland three years ago. In this instance it appeared as if they had crossed the lake from Canada; they were seen in immense numbers for three or four days. *Archippus* was said to occur in Australia, where it also occasionally swarms.

(To be concluded in our next.)

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MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Concluded from September No.)

References were made by Mr. Grote to several rare captures of Lepidoptera in the vicinity of Buffalo. Among others he had taken *Thecla ocellifera*, which is also found in the West Indies. Mr. Saunders stated that he had again reared a specimen of *Thecla strigosa* from thorn, and referred to the capture of specimens of *P. thoas* and *P. marcellus* at North Ridge, Ont., by Mr. F. C. Lowe, of Dunnville. Mr. Cook said that *thoas* had been found this year at Lansing, that it occurred there to his knowledge some three years ago, and that last season it was quite common, the larva feeding on prickly ash. Mr. Riley stated that the larvae of *philenor* feed on a creeping plant very closely allied to Aristolochia. Mr. Ison has found *philenor* scarce about Cleveland during the last five or six years, but *marcellus* rather common ; the larva of the latter feeds on pawpaw. One of the Detroit members remarked that there were pawpaw bushes growing within a few miles of Detroit.

A discussion on sugaring for Noctuæ was next in order. Mr. Ison reported excellent success with this method at Cleveland ; he preferred adding a little rum to the usual mixture of beer and molasses or coarse sugar. Mr. Lintner greatly interested the members in relating his wonderful success in sugaring. He produced a tabulated list of Noctuidæ captured or observed at sugar at Schenectady, N. Y., commencing with July 7th, giving the results of sixteen evenings in that month, and four evenings in August.

Seventy-eight species of Noctuæ are recorded, and opposite each species observed or collected is placed a check in a column bearing the day of the month at its head. Four species were observed on each evening, viz., *Hadena arctica*, *Hydroecia sera*, *Homopyralis tactus* and

Asopia costalis. Of the first two, hundreds could have been collected on a single evening. *Hadena lignicolor* was unobserved on only one evening; *Erastria carneola* on only two evenings; *Catocala ultronia* and *Hadena devastator* on only three evenings.

The following species were common: *A. herbida*, *A. haruspica*, *A. plecta*, *Orthodes infirma*, *Pseudothyatira expultrix*, *Hydroccia nictitans*, *Amphipyra pyramidoides* and *Erastria nigritula*. Of *Catocala ultronia* about *seventy* examples in fine condition were captured; of *Catocala nuptala*, of which not a single example had ever before been taken by Mr. L., thirty-six were collected, and of *Catocala parta* sixteen examples had been secured, all in perfect condition. Specimens of *Catocala Meskei*, *C. serena*, *C. Briseis*, *C. Clintonii*, *C. polygona* and *C. similis* had also been obtained.

Mr. L. has become quite enthusiastic over the success with which he has met thus far, in the number of rare species collected, and particularly in the perfect condition in which the larger portion of them are obtained. It is his purpose to continue his collecting in this method, and also the tabulation of the results. The table, when completed at the end of the season, will probably be published in the New York State Museum Report. We are sure that it will prove a valuable contribution to that part of the natural history of our moths which relates to the number and duration of their several broods.

Mr. Mann exhibited specimens of the wood of *Agave Americanum*, which, when cut of the proper thickness, may be used as a substitute for cork. This wood is remarkably light and porous, and pins may with great ease be firmly pushed into its substance. It grows in Brazil, and can be obtained from Mr. Mann at a lower price than cork. In proof of the suitability of this material for the purpose named, Mr. Mann stated that Wallace preserved all his specimens collected in the East Indies in boxes made with pieces of this wood pinned together with thorns.

At a late hour this most enjoyable meeting was brought to a close.

On Thursday afternoon a large proportion of the members of the club joined in an excursion to some good collecting grounds in the neighborhood of Fort Wayne, the party being under the direction of Mr. Hubbard, of Detroit. A very pleasant and profitable time was thus spent, and many interesting specimens captured. In addition to the advantage enjoyed of closer social intercourse between the "brethren of the net," this occasion afforded an opportunity for the mutual exchange

of practical ideas in regard to collecting insects which no in-door meeting could have afforded. It seemed as if every member had *some* original idea of his own either in reference to capturing or carrying specimens, the advantages of which were freely urged and as freely discussed with much profit. After thoroughly enjoying themselves for several hours, the members returned at nightfall well satisfied with the afternoon's sport.

On Friday morning a second meeting of the Entomological Club was held at the rooms of the Detroit Scientific Association. In the absence of the President, Mr. Lintner was called to the chair.

The Committee on Nomenclature reported as follows :—

" The committee appointed at the last meeting of the Entomological Club to consider whether any immediate action is advisable on the part of the club to aid in establishing uniformity in zoological nomenclature, finding that the committee of the general association intends to report during the present session, and deeming it best to await this report before making any definite proposition, would at the present time recommend that the club appoint a committee of five to prepare and present to the club at its next annual meeting a compendium of the views of the leading entomologists of the country upon points which, in their judgment, require elucidation, and also to present a series of resolutions touching such points, in order that intelligent discussion may be had upon them, and some general agreement, if possible, arrived at.

Signed, SAMUEL H. SCUDDER,
C. V. RILEY,
WM. SAUNDERS."

On motion the report was adopted, and the appointment of the committee left with the President, who subsequently nominated the following gentlemen :—Messrs. Scudder, Saunders, Grote, Riley and Leconte.

An interesting discussion then took place in reference to the various methods of pronunciation followed by entomologists when speaking of insect names, which culminated in the following resolution, which was carried unanimously.

Resolved, that in view of the desirability of securing uniformity among Entomologists in the pronunciation of the names of insects, Mr. O. S. Westcott, of Chicago, be requested to prepare such an accentuated list for publication in the CANADIAN ENTOMOLOGIST.

Mr. Westcott very kindly promised to give his attention to this matter at an early date. We shall hail the advent of this list with much satisfaction; it is a work greatly needed, and coming from the hands of one who is in every way well fitted to do it justice, we feel sure that it will command general assent.

The next subject of discussion was on certain offensive names which have been proposed for insects, in which most of the members took part. The following resolution was unanimously adopted :—

Resolved, that in view of the fact that certain names have of late been proposed for insects which are offensive and unwarrantable, that the Committee on Nomenclature be requested to present at the meeting next year a list of such names as should be ignored, so that the club may take action in reference to them.

Some explanations were then offered in regard to a valuable discovery lately made by Mr. George Dimmock, of Springfield Mass., of a ready method of removing the scales from the wings of Lepidopterous insects, so as to display the vein structure. Mr. Dimmock had kindly shown the admirable working of his process to a number of Entomologists at his room the evening previous, when all present were struck with the great practical value of the discovery. After full explanations to those present who had not seen the working of the process, it was resolved, "That the thanks of the members of the Entomological Club be given to Mr. Dimmock for his valuable discovery in reference to a ready method of denuding the wings of insects."

This process of Mr. Dimmock's formed the subject of a paper read before the American Association, and which will be published, we believe, in an early number of *Psyche*. It may thus be briefly explained: All the materials necessary are a little alcohol, a saturated aqueous solution of chloride of lime, a phial of pure muriatic acid and another of sulphuric acid. The wings are first moistened with alcohol, then transferred to the solution of chloride of lime, to which a little of the sulphuric acid has been added. After immersion for a few moments, the coloring matter of the scales rapidly disappears. This result may be hastened by taking the wings out of the chloride of lime solution and immersing for a moment n the muriatic acid, diluted with twice its weight of water, and then returning them again to the former solution. This alternation may be repeated as often as required. By this means any quantity of wings of Lepidoptera may be safely and entirely denuded with little or no trouble.

The denuded wings were neatly mounted by Mr. Dimmock on white cards, to which they had been gummed. An interesting collection, illustrating the nerve structure of many of the genera of moths, was exhibited by him, to the great gratification of all present.

In the compilation of these memoranda in regard to the meetings of the Entomological Club, we are greatly indebted to the Secretary, Prof. C. V. Riley, who very kindly placed his notes at our disposal; also to Mr. B. P. Mann, of Cambridge, who did us similar service.

ON CATOCALA VERRILLIANA, WITH NOTES ON CATOCALA RELICTA.

BY A. R. GROTE, BUFFALO, N. Y.

Catocala Verrilliana Grote, Bul. B. S. N. S., 3, 12 (Aug., 1875).

The smallest N. Am. red-winged species known. It has a resemblance to *polygama* and *fratercula* in the ornamentation of the primaries. Fore wings gray, shaded with blackish; lines black. A diffuse basal black shade. T. a. line diffusely shaded with black. Reniform small, yellowish, more or less distinctly double ringed. Sub-reniform small, yellowish, disconnected with the t. p. line. T. p. line shaped much as in *polygama*. Hind wings bright red. Median black band narrow, tolerably even throughout, not attaining internal margin. Terminal band black, narrow, not quite attaining anal angle. A red apical mark, opposite which the fringes are pale. Medially the black band is five times outwardly scalloped, and opposite this scalloping the fringes are blackish. The red color again prevails below them on the margin, with the pale fringes; towards anal angle the fringes are dusky. Beneath, both wings red, with constricted median band on hind wings not attaining the margin.

Expanse 48 m. m. G. W. Belfrage, Bosque Co., Texas, June 13. Dedicated to Prof. A. E. Verrill, of New Haven. Interesting as a form of the red-winged group, resembling the yellow-winged and smaller species of the genus.

I am indebted to Prof. Hopffer, of the Royal Museum of Berlin, for a beautiful water colored drawing of the Texan *Catocala frederici* Grote,

the types of which species, from Texas, are contained in the Royal Museum.

Catocala relicta (Walk.)

I have recently examined my material of this species taken in Buffalo and Batavia, N. Y., and I find that the dark shading of the fore wings is not a sexual, but a varietal character. I have a male (as shown by the simple frenulum and the genitalia) which is darker than the specimen figured by Mr. Strecker as a female. I have also a female whiter than Mr. Strecker's figure of the male as regards the fore wings. It is evident from the form of the abdomen that both Mr. Strecker's figures are males. The sexual character is adopted from earlier writers, who had slender material, without personal verification by Mr. Strecker.

ON NEW SPECIES OF AGROTIS.

BY A. R. GROTE, BUFFALO, N. Y.

Agrotis Treati, n. s.

♂. Allied to *A. bicarnea* Guen.; smaller and distinguishable by the evenness of the t. p. line. Fore wings dead brownish black. T. a. line rigidly oblique to submedian fold, not rounded as in its ally, and with a less prominent tooth on internal margin. A very faint yellowish shading to the line and also on the costa at inception of t. p. line, where *A. bicarnea* is strongly marked with carneous. T. p. line shaped as in its ally, but even, geminate, the inner line not scalloped; the component lines include a pale shading. Disc velvety black between the narrow stigmata, which are concolorous with the dead black of the wing. A black shade at base below the median vein. All the transverse lines geminate; the inner line of the basal and t. p., and the outer line of the t. a., marked with velvety black. In one specimen there is an absence of the velvety black shades; this one is in imperfect condition and allows of no certain description. Hind wings yellowish gray, paler than in *bicarnea*, with a noticeable terminal darker shading. Beneath with common line and

strong lunule on secondaries. Head dark brown on vertex, with pale marginal lines; terminal palpal joints pale; collar brown, with a black and pale line at base. Legs dark, pale dotted. Thorax brownish black, with pale line at base of tegulæ. Abdomen like secondaries.

Expanse 34 m. m. Mass., Mr. Thaxter, No. 2,311. Named for Mr. James O. Treat, of Andover, Mass.

Agrotis brunneipennis, n. s.

♂. Allied to *cupida*, but smaller. Fore tibiae unarmed. Thorax and fore wings of a glossy chestnut brown, somewhat reddish. None of the usual markings are noticeable. The subterminal space is stained with blackish. Following the s. t. line is a series of faint pale interspaceal fleckings. Ordinary lines indicated on costal region. Hind wings blackish fuscous. Abdomen beneath stained with reddish brown as is the costal region of primaries; else the blackish wings beneath show only a common black transverse line, which fades out towards the internal margins. Palpi black at the sides. Head brown above.

Expanse 30 m. m. Mass., Mr. Thaxter, No. 2,303.

Agrotis friabilis, n. s.

♀. A small species with a resemblance to *Bostoniensis*. All the tibiæ spinose, the fore pair with larger terminal spinules; clypeus roughened. Fore wings fuscous gray, with indistinct darker markings. The t. p. line is lunulate; the t. a. line widely geminate and dentate; stigmata obsolete; median shade noticeable; terminal space more purely gray than the rest of the wing. Hind wings concolorous, pale grayish fuscous, above without line or spot; beneath (where they are whitish with the costal region powdered with fuscous) there is a faint median shading. Fore wings beneath with a faint median line distinctly marked in black on costa.

Expanse 30 m. m. Taken by Mr. Geo. Norman; number 371.

Agrotis badicollis (Grote).

Mr. Norman sends me a fine male with the transverse lines broadly marked in black, and Mr. Lintner has again sent me my ♀ type. I have mistaken the black scales about the eyes for true lashes. Mr. Morrison's correction, as to the genus, must, then, be accepted. The species seems to vary greatly in distinctness of markings.

Agrotis campestris Grote.

This species, collected by Mr. Geo. Norman at Orillia, No. 372, appears to be a form of *tessellata* (*maizi* Fitch); it differs by the red brown tinge of thorax and fringes, the unicolorous purplish black brown primaries, and the coarseness of the black median lines. Specimens are before me from N. Y. (Mead) and Vancouver Island (Hy. Edwards, 5,644). With other species of the genus, it is described in a paper presented to the Academy of Natural Sciences, Philadelphia.

ON A NEW CANADIAN LITHOPHANE AND SCOPELOSOMA.

BY A. R. GROTE, BUFFALO, N. Y.

Mr. George Norman has recently taken a number of the species of the genus *Lithophane* at Orillia. In a recent letter, Mr. Norman records the capture of *petulca*, *ferrealis*, *disposita*, *Bethunei*, *semiusta*, and "that lovely *oriunda*, a single specimen." Mr. Norman also finds a number of specimens of a large light grey species allied to *laticinerea*, but differing from that species and *cinerea* in the position of the stigmata, the color, and the shape of the subterminal line. I propose to call the species *Lithophane Georgii*, after its discoverer. Fore wings bluish grey, with a white shade on the shoulder above the black basal dash. T. a. line dentate, indistinct. Orbicular erect, not oblique, moderate, concolorous, with a paler annulus. In shape, color and form this spot offers decided differences when compared with allied species. Reniform squarish, darker stained than the wing, proportionally smaller than in allied forms. T. p. line sub-obsolete; it appears to run nearer the subterminal line than usual; the latter line consists of a series of disconnected, distinct, interspaceal, blackish, triangulate marks. Fringes entire, concolorous. Hind wings blackish fuscous, beneath with spot and line. Thorax concolorous with primaries; collar with a black line in front; face with a black line; antennæ whitish at base. *Expanse* 48 m. m.

I have received from Mr. J. Pettit, of Grimsby, Ont., two specimens of a small species of *Scopelosoma*, which I propose to call *Pettiti*. The little roughly scaled species presents some resemblance in ornamentation to *Scopelosoma Graefiana*. The color is orange ferruginous over light yellow;

head, antennæ, thorax and fore wings of this color. Primaries with three transverse darker lines, the t. a., median shade and t. p. lines, all indistinct, the t. p. line followed by faint blackish points. Orbicular small, round, pale centered. Reniform large, vague, sometimes with a few blackish scales inferiorly. T. a. line perpendicular, undulate ; t. p. line even. Abdomen and hind wings above, very pale silky yellowish ; beneath a little darker, the latter with orange spot and median and terminal lines ; fringes concolorous. Fore wings with line and dot faintly shown. *Expanse* 30 to 31 m. m.

ARGYNNIS MYRINA AND ITS ALLEGED ABNORMAL PECULIARITIES.

BY W. H. EDWARDS, COALBURGH, W. VA.

In the Am. Nat., Sept., 1872, Mr. Scudder published an essay entitled "The Curious History of a Butterfly," in which it is stated that in two N. American species of the "genus Brenthis," namely, *myrina* and *bellona*, occurs a phenomenon considered by the author to be quite unique among butterflies : there being two sets of individuals, each following its own cycle of changes, apparently with as little to do with the other set as if it were a different species ; each set having its own distinct seasons and thus giving rise to the apparition of two or three successive broods in the course of the year. At the very end of the season one of these sets, which the author calls the "aestival," lays eggs which hatch in a few days ; the larvæ at once commence hybernation, to awake and begin to feed early the next season, attaining their growth by the end of June, and emerging as butterflies about the middle of July. These butterflies continue on the wing till the end of September.

The second set, called the "vernal," hybernate as half grown caterpillars, and the butterflies from them appear about the middle of May, sometimes earlier, but are hardly common before the end of May, and also live till September. These lay their eggs the last of July and early in August, the eggs hatch, the larvæ moult twice, and beyond that, behave differently, some at once entering on their hybernation, giving butterflies

in May again ; the others proceeding to chrysalis, from which the butterflies emerge in September, "*doomed to an untimely end. Their sisters of the aestival series are busily laying eggs to perpetuate the race, but to them is this boon denied: the cold autumnal blasts sweep them away before the eggs are half developed in their ovaries.* It is, in fact, a vain effort of Nature to develop a second brood." Elsewhere this is spoken of as a "waste of energy on the part of Nature."

It is expressly stated that "*in this butterfly the eggs are wholly undeveloped at the birth of the female.*" The above statement of facts leads the author to conclude that "we have here two independent series in the same species, each single-brooded, but one making an effort towards a second generation, *invariably ending in disaster;* that it is improbable that the blood of both series ever commingles through the union of the butterflies of the two series, because, although the generations overlap, *the males of a brood are the first to disappear*, and the *females the last to appear*, and at best there would be few that could thus mate ; moreover, *since the eggs of the freshly emerged females are not fully developed for weeks or even months*, the effect of such a union would be questionable. Yet if there is no union between the two series, then are the vernal and aestival groups practically as distinct from each other as any two species. The two groups *show a difference such as usually characterizes somewhat distant genera.*"

Mr. Scudder's observations on these species were so different from those on an allied European species, *euphrosyne*, as related by Doubleday, that he could not comprehend the statement given, and says : "By this account the butterflies *(euphrosyne) lay their eggs on their first appearance; either they differ in toto from their congeners in America, or there is some error in this statement* (of Doubleday).

When I first read Mr. Scudder's paper it occurred to me that possibly there was error in his statement of facts. But as these butterflies are not inhabitants of my district, I have had no opportunity to put Nature to the question till the last season, and the result is as I anticipated. She may dry her tears, unveil her blushing cheeks, and walk forth acquitted of the horrid charge. I think it will appear that the history of the butterfly, although curious, as I find the history of every species of butterfly which I have studied, is not unlike that of many of the double-brooded species, and certainly runs parallel with some of them.

In July, 1875, I was at Hunter, in the Catskill Mountains, and both

myrina and *bellona* were rather abundant. The females of both species were more or less worn and were heavy with eggs. I shut up half a dozen of each species in a muslin bag, which was drawn over the top of a flower pot in which I had set plants of wild violet. Between the 20th and 25th inst. both species laid many eggs, and these hatched in about five days. I lost nearly all the *bellona* eggs by mailing them to Coalburgh, but three which I sent Miss Peart for drawings gave larvæ, and in due time the larvae became chrysalids and yielded butterflies on or before the 1st of September.

But as I kept the larvae of *myrina*, my observations relate to them only. These grew very rapidly, moulted five times, and the first of them reached chrysalis on the 27th of August, about thirty days from the egg. The butterfly emerged on the 3rd of September, and was a female. Next day five emerged, three ♀ and two ♂ (I mention the sex to show that the females emerge as early as the males, and this is so in all species of butterflies which I have made observations on, except one. *Apatura clyton*, and in this the male has been found to appear about a week in advance of the female). The other butterflies emerged at intervals till September 9th, by which time twenty-five had appeared. Not one of this brood of larvae hybernated after the third moult, or at all, and all the chrysalids gave butterflies. On opening the abdomens of the newly emerged females, *they were found full of nearly mature eggs*. These eggs were soft, but nearly or quite full sized, and distinctly ribbed, which would not be so if they were not almost ripe for deposition. I have never found this to be the case in the larger species of *Argynnis*, there being so far as I have examined, and I have done this in very many instances, no appearance of the egg for weeks after the females are on the wing. But in some other butterflies, as *Papilio ajax*, the eggs are almost ready to deposit when the female issues from the chrysalis, and it is certain that she deposits them within a few days—say a week—from chrysalis.

So far I have given my own observations upon *myrina*. Adding to them such as are related by Mr. Scudder, and not involving the error as to a long period of time being required to mature the eggs, and the history of the species resolves itself into this shape.

The butterfly of the fall brood emerges from chrysalis about the 1st of September, lays eggs on or before the 15th, the larvae hatch between the 20th and the 24th, and go at once into hybernation, to awake in May, and reach chrysalis about the middle of June, and the butterfly about the 25th

of June. If, however, any of the last brood of larvae, instead of at once beginning hybernation, incline to feed for two or three weeks, there is plenty of time before severe frosts come to do so and reach the third moult, at which time, in all five-moulting species that I have experimented on, the hybernation occurs, if at all. In such case the larvae would also awake in May, and would reach the butterfly stage two or three weeks earlier than the 25th of June. If any of the summer brood of larvae hybernate after their third moult (a fact which I had no opportunity to establish), then the larvae of both broods would awake at the same time and become butterflies at the same time, making the summer brood. It is to be observed that the several stages of the same brood of larvae do not occur in exactly the same periods of time. From eggs laid on the same day, by the same female, some of the larvae hatched will reach chrysalis several days before others. In the larger *Argynnis* there will be such a difference, amounting to two or three weeks. Therefore some of the larvae which hybernate at the third moult may be retarded so that their butterflies shall emerge contemporaneously with those which proceed from the larvae that hybernate as soon as they leave the egg. The case is parallel with that of *Phyciodes nycteis* and with that of *Apatura celtis*, both double-brooded species, both discovering larvae from the summer brood which hybernate when half grown, while a part of the brood go on to chrysalis and give the fall brood of butterflies, these again producing larvae which also hybernate. (In both these the last hybernation begins after the larva is half grown, the third moult in *nycteis*, the second in *celtis*.) Mr. Scudder has made a hypothetical case which is precisely the actual case that I have set forth above. He says: "Should the season be so long that the *second brood could lay eggs*, the caterpillars would then be forced to hybernate as those of the aestival series and *become members of that series the next year. Thus the vernal series would continually feed the aestival*," &c. Moreover, in no species do the several preparatory stages of its members run even. On the contrary, in any, whether single or double brooded, there will be found by different females eggs freshly laid, eggs ready to hatch, young larvæ and mature larvæ, all at the same time. By this means there is kept up for a long period, often for weeks, a succession of newly emerged butterflies of the same brood, and the newer and older are constantly mating. On one day in September of this year I cut a branch of Wild Senna *(cassia)*, on which at the moment were newly laid eggs of *Terias nicippe*, larvæ in every stage of growth, and a butterfly of the same species just emerged and still resting on the empty shell of its chrysalis.

I have bred from the egg four of our larger species of *Argynnis*, viz., *diana*, *cybele*, *aphrodite* and *idalia*, and have had the egg and chrysalis of *atlantis*, and have drawings of the several stages of each species; and now having bred *myrina*, I can say that so far as I have seen of the preparatory stages of all these species, they are congeneric The simple difference that is found among them is not in the shape of the eggs, or the forms and habits of the caterpillars, or the forms of the chrysalids, but merely in the behavior of *myrina* as regards the second brood, each of the others being, so far as is yet known, single brooded.* And neither in the preparatory stages nor in the butterflies themselves do I see any reason for separating *myrina* and the smaller species from the genus *Argynnis*, or making more of them than a group. A group is as expressive as a genus, and a genus with its groups should present at one view an entire class with all its families, inter-related, though in differing degrees, as having had a common ancestor, and any system of arrangement which elevates what are properly groups into independent genera, destroying the unity of the class, strikes me as unnatural, and therefore unphilosophical.

But in passing we may as well look into the facts about this genus *Brenthis*—*Brenthis* Hübner (Scud. Syn. List. 1875) and learn something about the manufacture of modern genera.

The species *myrina* is closely like *euphrosyne* of Europe, and congeneric with it, no matter how *Argynnis* be split up. Hübner, in his Verzeichniss, amused himself with assorting the known butterflies into batches or parcels, as a child would sort his alleys and taws, by color, stripes and shape, putting blues into one lot, browns into another, one-striped into a third, two-striped into a fourth, regardless of characters which would be generic, that is, *which would indicate blood relationship or a common descent.* It is a very rare thing to find one of his batches —which he called a coitus, meaning a batch or assemblage, and which is in no sense a genus, for the element of common descent does not enter into this whimsical system—co-extensive with a genus. It is by the merest chance if it is so. Nor does the coitus correspond with a natural

* Though there are some reasons for suspecting that in West Virginia the other species must be double brooded also. That, however, is not determined, and I do not assume it. But this difference in the same genus as regards the number of broods, supposing it exists in *Argynnis*, is paralleled by the *Apaturas celtis* and *clyton*, the former being here double, the latter single brooded.

group under a genus. At first sight it may sometimes seem to do so, the species being assorted in twos and threes, but it will be found that whether the coitus embraces two or twenty species, the butterflies under it are most likely such as belong to distinct genera, and sometimes so distinct that one hundred or two hundred pages of Kirby's Catalogue separate them. And an instance of this mis-assortment is found in the coitus *Brenthis*. Under this head are ranged five species, viz., *hecate*, *dictynna*, *thore*, *daphne* and *claudia*, the latter as much out of place in such company as a horse in a drove of asses. But the horse is dapple and the asses are dapple, each has one tail and two ears, and behold a Hübnerian coitus! The definition of *Brenthis* is "the hind wings below gaily clouded, pale spotted," and it is ranged under the first family of the fifth stirps. This family is called Reticulatæ, and embraces two coitus only, viz., *Phyciodes*, under which our *tharos* comes, and *Brenthis*. The definition of the family is thus given: "The wings above striped like a grating; the hind wings below spotted with colored spots on a pale yellow ground, marked with eye-like spots." *Thore*, an European species very much like our *bellona*, and congeneric with it as *myrina* is with *euphrosyne*, is placed in *Brenthis*, along with *claudia*, and these are separated from the batch which includes *myrina*, *not merely by the limits of a coitus*, *but of a family even*, *in order to get them among the Reticulatæ by the side of tharos*. This next family, the Phalaratae, is thus defined: "The wings differently spotted, the under side ornamented with pearl-colored spots." And the first coitus under it is *Argynnis*, the definition of which is: "the hind wings below variegated, spotted with shining white." Under this coitus comes *euphrosyne*, and therefore *myrina*, included in this loose definition solely because it has white spots. Two more coitus are made, called *Issoria* and *Acidalia*, which include the larger species of *Argynnis* (not Hübner's), *lathonia*, *cybele*, *diana*, &c. Of these absurd divisions, Mr. Edward Doubleday (Remarks on the genus *Argynnis*) says: "they are so unnatural that they can in no case be adopted."

But suppose these batches were not unnatural, but were co-extensive with genera, how comes *myrina*, which, as it agrees with *euphrosyne*, is placed by Hübner under *Argynnis*, filling in some little degree the requirements of that coitus, to be remanded to the coitus *Brenthis*, which belongs to another family even, placed along side of *Phyciodes tharos*, and the requirements of which coitus it does not fill at all? It is an unwarranted use of Hübner's name, applying it to what he expressly says it shall not be applied. It is taking one of his blue taws and dropping it among the

striped ones, doing violence to all his notions of symmetrical arrangement. He would have rejected the blue taw with abhorrence. What does the word "*Brenthis* Hübner" mean, if not that the genus *Brenthis* was created by Hübner, and that his definition includes the species sought to be placed under it? If it has any other meaning I am ignorant of it, and if it does mean that it is false. This is a fair sample of the uses to which Hübner's absurd and worthless Catalogue has been put. Very few Lepidopterists in this country know anything of Hübner's books, and most are disposed to accept in some degree the dicta of any one who sets up to reform the nomenclature. But if reform be needed, which is very questionable indeed, it is not to be brought about by lugging Hübner into the arena. To go back at this time of day to the Verzeichness is to go back to the balls and tops and games of school-boys.

NOTE ON DATANA PERSPICUA G. & R.

BY A. R. GROTE, BUFFALO, N. Y.

Since the original illustration and description of this species, ten years ago, in the Proceedings of the Entomological Society of Philadelphia, it has not been noticed, except by the late Mr. B. D. Walsh, in the same Proceedings, vol. 5, p. 194-5. I have been since last year indebted to Prof. C. V. Riley for a number of specimens of *perspicua*, raised from larvæ found on Sumach. It is enough to say that the specimens bear out the specific validity of a form which is perhaps the most easily recognized among the difficult species of this genus. I was able to separate the imagos of a number of the species bred by Prof. Riley, by the characters laid down by the late Mr. Robinson and myself in our revision of the genus. Specimens of *contracta*, *integerrima*, *ministra* and *perspicua* were sent me by Prof. Riley; no true specimens of *angusii* were included. I observed the larva of *integerrima* at Detroit, August 13, and again on Grand Island, Niagara River, Aug. 19, apparently nearly full grown. I have not had hitherto any specimens of *perspicua*, before receiving those sent me by Prof. Riley, who will, I hope, give us some observations on the genus before long. I am glad also to be able to find that the facts

relieve us from the imputation of having described "not the *species*, but the *individual*," placed upon us by the late Mr. Walsh in the case of *D. perspicua*. And as to the "very limited number of specimens," the argument which covers two pages seems to have been compiled almost wholly from Fitch and other writers who mixed up a variety of forms under the name of *ministra*, and who, in consequence, cannot be considered as any authority on the subject. I have yet to see imagos of *Datana* which I cannot refer to one or the other of the forms in this genus, which are separable also on larval characters. It matters little whether we call these forms "species" or "varieties," so far as the advisability of according them different Latin designations is concerned.

NOTES ON CERTAIN SPECIES OF ARCTIA.

BY A. R. GROTE, BUFFALO, N. Y.

Arctia arge (Drury).

A male specimen taken by the late Mr. C. T. Robinson, at Brewster's, N. Y., varies by the fore wings being black, the veins broadly bordered by flesh color. The ordinary triangulate black interspaceal markings have all fused. Hind wings shaded entirely with blackish, none of the usual spots being visible. Beneath as above. Body as in the type.

Arctia Anna Grote.

Contrary to Mr. Stretch's remark, two specimens of this species occurred in Penn. One is in Dr. Packard's collection, and is recorded by him in his Synopsis. The markings of the fore wings prevent the idea that it is a "melonotic" var. of *Persephone*, as suggested by H. Strecker. *Persephone* Grote was described *after* this species; I supposed at first the two belonged as ♂ and ♀, only one sex of each being known to me. More material is needed to decide these points, bare opinions being useless and offensive.

Arctia Michabo, n. s.

♀. Belongs to the series of *virgo*, *Saundersii (intermedia)*, *Edwardsii*, *Blakei*. The size is next to *Saundersii*. It is like *virgo* in having black spots on the middle of hind wings, one rounded one on the median vein

within and below the rounded discal spot ; below this, on internal vein, is another sub-obsolete spot. The sub-marginal spots are very large irregularly triangulate : the marginal spots are limited to two superiorly, which do not tend to run along the edge of the wing as in allied forms ; the fringes are but little paler than the rosy wings, which are more diaphanous than in its allies. Fore wings like *Saundersii* in having linear venular markings ; the bands are like that species, the color is more pinkish, the discal stripe much broader. Beneath both wings alike roseate, with the black markings repeated. Thorax and head like its allies ; the breast is however, pink, and the legs spotted with pink and not wholly blackish. Costa of fore wings without black markings beneath. *Expanse* 43 m. m. Nebraska, Mr. Dodge.

Arctia intermedia Stretch.

My specimens from Belfrage lead me to suppose a different species from that illustrated by Mr. Stretch, whose figure seems to me undoubtedly to represent *Saundersii*. It is probable that a number of specimens sent by Belfrage belong to a different species from that sent to Mr. Stretch, and I provisionally propose the name *Stretchii* for the following form. It differs from *intermedia* and *Saundersii* by the presence on the fore wings of an inner sub-basal transverse band, narrowing at median vein, broad below the longitudinal stripe. On hind wings *all* the spots much reduced. The anus is not black at the sides. Oct. 7, 10. Dr. Harvey has recently referred specimens of this form to *Saundersii*.

Arctia Snowi, n. s.

♀. Habit of *nais*, of which I thought it at first an extreme variety, but the fringes on both wings are wholly black. Head, thorax, legs, wholly black ; abdomen crimson at sides. Wings wholly black. A crimson discal rounded lunule, narrowly yellow edged ; a short broken transverse bar, similarly colored, opposite the disc. Hind wings with a moderate crimson lunulated spot outwardly towards the apices. Beneath as above, a dash above the discal spot. *Expanse* 38 m.m. Kansas, Prof. Snow.

DESCRIPTION OF A NEW HADENA FROM THE WHITE MOUNTAINS.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Hadena ancocisconensis (nov. sp.)

Expanse 40 m. m. Length of body 16 m. m.

Eyes naked, with short lashes. Antennæ in the female simple. Palpi gray, the third joint very short. Collar whitish beneath, above bearing a transverse, partially interrupted black line. Thorax mingled light and dark gray; no prothoracic tuft, metathoracic tuft low and longitudinally furrowed; sides of the thorax deep black and very conspicuous. Abdomen light gray, with several slight dorsal black tufts, and one very strong one, tipped with white on the third segment. Tibiæ unarmed. Anterior wings having the basal space light gray, whitish at the base, and contrasting with the thorax and a black acute basal dash; inner margin of the wings white near the base, this white space is bounded above by another basal dash, finer than the one last mentioned; median space darker gray; the ordinary spots are of the usual shape, faintly outlined in black and filled with light gray, which extends around and beyond them, but less distinctly; interior line simple, black and very acutely dentate, forming inferiorly two very long teeth, the upper of which is connected by a black dash with the exterior line; the latter is well removed towards the outer margin, obsolete above, below it appears as an oblique black line, followed by a distinct white shade, this is followed by another thicker black line, slight traces of the subterminal line otherwise obsolete, and another white dash before the angle, enclosing a black spot; a series of black dashes in the terminal space, three of which are united, forming the usual W-shaped marking; the white subterminal shade line extends sometimes around this marking. Fringes gray, with white points at the terminations of the nervules. Posterior wings gray, darker towards the margin. Beneath gray, nearly unicolorous, without the usual median line.

Hab. Glen Valley, Mt. Washington, N. H.

Described from a specimen in my collection, taken at sugar in August.

The alternation of black and white at the inner angle makes this species very easy to recognize; it differs in this respect from all other members of the genus.

THE LUNA MOTH *(Actias luna).*

BY R. V. ROGERS, KINGSTON, ONT.

As supplementary to my remarks on this pretty creature in the August number of the CAN. ENT., I would say that on June 6th a friend gave me a captured female Luna. For two or three nights I used her as a trap to entangle unwary males, but in vain as far as my cabinet was concerned: the weather was cold. On the 7th, 8th and 9th, during the silent watches of the night, she deposited in her place of confinement, in all, about 100 eggs of a dark brown or chocolate color, flattened at the sides, smooth and about .005 of an inch in length; the sides were of a lighter shade. On the 13th the moth died, having accomplished the end of her existence. On the 20th the first little larvæ appeared, having made their escape by eating an oval opening in the end of the shell; the inner surface of the egg now appeared perfectly white. The caterpillars were about .02 of an inch in length; head black, greenish on top and yellowish in front; the body black, with two yellow spots on each segment, and having numerous yellow hairs; the under part of the body and feet and legs were of a light yellow. Some crawled about with the empty shell on their tails, others carried it as an umbrella over their heads, but the majority seemed to discard it at once. The first day they were in a dark box, and they seemed very restless and would eat nothing; the next day I put them in a box with a glass cover, and they at once settled down contentedly to their life-long work of eating their daily bread. Others were born on the 20th and 21st. I fed them on elm leaves. On the 27th they had grown to over a third of an inch in length, and now the warts upon each segment were apparent, and the little hairs upon them were also visible.

On the 30th they began to change their skins; the head and body were now of a light green, with yellow warts on each segment; the hairs were neither as numerous or as distinct as before; there were a few dark ones on the front segments.

On the 4th of July the length of the largest was .45 in.; on the 11th, .6 in.; on the 13th they moulted a second time, and on the 18th they had attained the length of almost an inch.

Unfortunately, the food, the weather, the close watching, the narrow confinement, or something or other, did not agree with these unfortunate caterpillars, and one by one they would suddenly die, and my attempt to reap a rich harvest of cocoons was utterly foiled, and I succeeded in getting—not one; although up to the very day of their death they would eat the elm leaves apparently with great gusto: it was difficult for me to get a change of diet for them.

ON A NEW EUCHAETES.

BY A. R. GROTE, BUFFALO, N. Y.

Euchaetes Spraguei, n. s.

♂. Allied to *elegans*, but entirely stone color, like *egle*.

Fore coxae, head at base, two thoracic vittae, costal and internal margin of fore wings crimson. Abdomen above bright red, with dorsal black dots.

Kansas (Prof. F. H. Snow).

I name this beautiful species, which is of the same size as *elegans* and *Oregonensis*, after my friend Mr. Henry S. Sprague, of Buffalo, N. Y.

BOOK NOTICES.

Injurious Insects of Michigan, by A. J. Cook, of the Michigan State Agricultural College, 8vo., 48 pages, with numerous cuts. We are indebted to our esteemed friend Cook for a copy of this excellent report, in which is contained a concise summary of most of the facts known relating to the life history of a large number of our most injurious insects, with the best means of subjugating them. It is intended as a practical hand book to guide the agriculturists of Michigan, a purpose it is well qualified to serve.

We have also received from the same author a copy of an address delivered by him on *Phylloxera vastatrix*, at Munroe, Mich.; 8vo., pp. 10, with illustrations.

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THREE NEW GALLS OF CECIDOMYIÆ.

BY C. R. OSTEN SACKEN, CAMBRIDGE, MASS.

I hardly need an apology for presenting from time to time to the entomological public descriptions of galls of *Cecidomyiæ*, even when I did not succeed in rearing the fly. Such observations, unless published soon, are very apt to be lost; once published, they gradually accumulate and furnish a welcome material for the future monographer. To facilitate reference, I give here a list of my previous publications on the galls of North American *Cecidomyiæ*:—

1. On the N. Am. *Cecidomyiæ* (In the Monogr. N. A. Diptera, vol. I, p. 173—205).

2. *Lasioptera*, reared from a gall on the Golden-rod (Proc. Ent. Soc. Phil. 1863, p. 368—370).

3. Two new N. A. *Cecidomyiæ* (Proc. Ent. Soc. Phil. 1866, p. 219—220).

4. Biological notes on Diptera. Article first: *Asphondylia monacha*, n. sp., and other galls on Solidago (Trans. Ent. Soc. Phil. 1869, p. 299—303). Article second: A new Amer. *Asphondylia*: On some undescribed galls of *Cecidomyiæ*. Article third: A *Cecidomyia* living in pine resin (Diplosis resinicola, n. sp.); a gall of *Cecidomyia* on Wild Cherry; additions, corrections.

Cecidomyia (tiliæ) *verrucicola*, n. sp. Wart-shaped, round, pale green galls, 3—4 millim. in diameter, projecting on the upper and underside of the leaves of the linden. They occur between the ribs and veins and often upon them. In autumn they become brown, hard and woody, and spring open on the underside, a circular piece detaching itself and either falling to the ground, or remaining fastened to the gall by a small portion of its circumference, in the shape of a lid. Inside of the gall, when green, there is a low-roofed cavity, containing a white larva, with a distinct

breast bone, heart-shaped anteriorly, and ending in an elongate point posteriorly. The dry galls are empty. I found them common on Goat Island (Niagara Falls), on the hills near West Point, N. Y., in Cambridge, Mass., etc., in August and September, on the young shrubs of the linden.

Cecidomyia (urticæ) *urnicola*, n. sp. Galls on the upper side of the leaves of *Urtica gracilis*, either on the midrib, or, more often, on the lateral veins. Urn-shaped (I mean the shape produced by cutting off the smaller end of a slender pear) up to 3 m. m. high, subsessile (that is, connected by a very small surface with the leaf), pale green, semi-transparent, succulent gall, bearing a short style or nipple at the upper, truncate end. Inside, the larva of a *Cecidomyia*. Lake George, July, 1863; Trenton Falls, July, 1874; not uncommon, but not in large numbers. Each leaf bears one, sometimes two galls, seldom more.

The gall produced by a *Cecidomyia* on the European nettle, and described by Perris, Ann. Soc. Ent. France, vol. IX, p. 401, is different from the present gall.

Asphondylia (asteris) *recondita*, n. sp. Deformed terminal buds on the principal and the lateral branches of *Aster patens*. These galls consist merely in an arrest of growth and consequent accumulation of leaves, forming a bud-like body up to 10 or 15 m. m. in length. Inside I found pupæ which their structure proves to be those of *Asphondylia*. The horn-like, sharp projections on the head are contiguous here, precisely as in *Asphondylia sarothamni*, figured by Winnertz (Linn. Entomol. vol. VIII, Tab. I, f. 6). I found these galls on Lloyds Neck, Long Island, in September, but did not succeed in rearing the fly.

ON NORTH AMERICAN SPECIES OF PLUSIA.

BY A. R. GROTE, A. M., BUFFALO, N. Y.

Plusia monodon, n. s.

Allied to *precationis* and *gamma*. It differs by the distinct yellow shaded geminate t. p. line having but a single acute tooth at vein 2; the line running more outwardly at this point, and being otherwise even throughout. Also by the shape of the metallic spot; this is open, silver

bordered, running outwardly obliquely from the median vein to the t. p. line at vein 2, sub-triangulate, the bordering lines fusing outwardly to a point, forming an oblique uneven V. The median space below and beyond the metallic mark is shaded longitudinally with obscure chalceous. The reniform is a narrow angulate dark lunule. The orbicular incomplete, whitish edged. The subterminal is more dentate than usual, and shaded anteriorly with dark brownish, with a golden reflection inferiorly. The median space is dark brown above the metallic mark and below the median vein and the base of vein 3; also inferiorly. The ground color is a purple gray shaded with brown. The t. a line is even, rounded, distinct, like the t. p. line in color. Hind wings rather pale, with blackish hind borders; beneath pale grayish, not yellowish, and without the lines of *precationis*.

Expanse 36 m. m. Cape Breton. From Mr. Roland Thaxter.

Plusia pseudogamma, n. s.

Like *gamma*, but with a more contrasted color of fore wings. The t. p. line more rounded opposite the cell, succeeded by a white shading which appears again over internal angle without the s. t. line. The metal mark is like *gamma*, but broader and pure silvery. The space about the spot is shaded with deep brown. Inferiorly the median space is entirely chalceous. The t. p. line is stained with reddish and the inward tooth opposite the extremity of the metallic mark is deeper than in its ally. The s. t. line is less dentate than usual, preceded by a chalceous and brown shading. Hind wings pale gray with blackish borders. Abdomen with dorsal tufts. Beneath obscure gray, unlined. This species has a strangled reniform with narrow pale annulus, like *gamma*, while the orbicular is less conspicuous and the t. p. line is more even superiorly than in its ally.

Expanse 42 m. m. Cape Breton. From Mr. Roland Thaxter.

Plusia Dyaus, n. s.

Between *verruca* and *precationis*. Ground color pale olive-lilac gray. Collar and face of dorsal tuft olivaceous. Metallic spot an obtuse silver open mark, succeeded by a well sized detached silver spot. Orbicular with a pale shaded annulus, inconspicuous. Reniform incomplete, with a deep outer constriction and here outlined in pale gold, the annulus being perceivable inferiorly; beyond the reniform the cell is chalceous and inferiorly the median space is golden shaded, the wing about the metallic

marks being olive brown. Terminally the wing is washed with pale golden and there are two deeper golden shades resting on the whitish terminal line below the apex, the lower triangulate. The s. t. line is also superiorly preceded by darker shades. The ordinary lines are pale golden. Fringes pale, dotted at base, with a more prominent black dot opposite vein 3 and the triangulate deeper gold mark. Hind wings largely blackish fuscous, with pale fringes. Beneath with double lines. Nearest to *precationis*, a little smaller, paler, not purple colored, the median space all golden inferiorly.

Expanse 34 m. m. Texas, Belfrage, Nov. 2, No. 142.

Also from Jamaica, Mr. Thaxter, No. 2,076.

It may be distinguished from *verruca*, also, by the subterminal line not forming a broad tooth apically below costa, but being here rounded to the sinus opposite the cell.

Plusia pedalis, n. s.

Allied to *gamma* and *ou*. Hind wings wholly blackish fuscous, with whitish fringes lined at base. Fore wings more uniformly dark colored with the ornamentation of *ou*, but with the yellowish open metallic mark short, broad and somewhat foot-shaped, without any accompanying dot. Beneath dark, with median common line.

Expanse 36 m. m. Kansas, Prof. Snow, No. 273.

The following is a list of our North American species, following the method of Dr. LeConte's Catalogue of N. A. Coleoptera, adopted in Part 1 of the List of North American Lepidoptera by the late Mr. Coleman T. Robinson and myself, published in Philadelphia, Sept., 1868.

Plusia *Hubn.* (1806).

Type, Plusia chrysitis of Europe.

1—purpurigera *Grote.*
Dera purp. Walk.
2—aerea *Guen.*
Agrapha aerea Hübn.
3—aereoides *Grote.*
4—balluca *Guen.*
Dyachrisia ball. Geyer.
5—metallica *Grote.*
Pl. bractea ‡ Grote.
6—contexta *Grote.*
7—Putnami *Grote.**
8—striatella *Grote.*
9—formosa *Morr.* **
Leptina form. Grote.
10—thyatiroides *Guen.*
11—mappa *G. & R.*
12—bimaculata *Steph.*
Pl. u-brevis Guen.

13—biloba *Steph.*
14—verruca *(Fabr.)*
15—Dyaus *Grote.*
16—precationis *Guen.*
17—laticlavia *Morr.*—
18—labrosa *Grote.*
19—monodon *Grote.*
20—pseudogamma *Grote.*
21—gamma *(Linn.)*
22—ou *Guen.*
23—fratella *Grote.* * * *
24—u-aureum *Boisd.*—
25—pedalis *Grote.*
26—brassicæ *Riley.** * * * *
Pl. ni ‡ Grote.
27—oxygramma *Guen.*
Autographa oxygr. Geyer.
28—mortuorum *Guen.*
29—8-scripta *Sanborn.*
30—viridisignata *Grote.*
viridisigma Grote.
31—epigaea *Grote.*
32—ampla *Walk.*
33—simplex *Guen.*
34—pasiphaeia *Grote.*
35—diasema *Dalm.*—
36—parilis *(Hubn.)*
37—alticola *Walk.*
38—Hochenwarthi *(Hoch.)*
Noctua divergens Fabr.
39—devergens *(Hubn.)*—

The following species cannot as yet be identified from published data concerning them: Plusia flagellum, indigna, selecta, secedens of the British Museum Lists; Plusia falcigera and rectangula of Kirby; Noctua omicron of Linné.

ON SCOPELOSOMA AND ALLIED GENERA.

BY A. R. GROTE, BUFFALO, N. Y.

Eucirroedia, n. g.

The shape of the fore wings is like *Scoliopteryx*, and the ornamentation is like that genus, while the stigmata are well defined, the course of the lines being similar in the two genera. This is a much more robust form

* This species seems to vary in color; one specimen is very like *festucae* in this respect. A character is offered by the t. p. line, which runs inwardly to a point below the discal dot in *festucae*, and allows of an extension of the silvering within this tooth. In *Putnami* this sinus is rounded and shallower.

** Unknown to me since 1866, when I described the species and at once returned the type to my friend Mr. Treat; I indicated at the time the structural difference in the length of the palpi. Both this species and *thyatiroides* are apparently mimetic of the Bombyciæ.

*** Contrary to Mr. Morrison's supposition, I regard this as a valid species, differing specifically from the larger *P. ou*, taken by myself in Alabama. The t. p. line is straighter, the dot of the metal mark is separate, the size is uniformly smaller.

**** Dr. Speyer regards this species as valid on new characters; a Californian specimen does not differ from my Eastern material.

than the European *Atethmia xerampelina*, and has different shaped, more dentate primaries. Eyes naked, tibiae unarmed. *Eucirroedia pampina* (Guen.) has the colors of *Fodia*. I would restrict *Xanthia* in North America to the species *X. togata* (silago), also found in Europe; the genera might follow in this manner : *Glaea*, *Xanthia*, *Fodia*, *Eucirroedia*, *Scoliopteryx*, *Scopelosoma*, *Lithophane*. I, at one time, identified *X. aurantiago* Guen., but have now no specimens before me.

Scopelosoma.

The North American species are now eight in number, *sidus* Guen. being unknown to me, unless the latter is = *vinulenta*. The difficulty has arisen in that *Walkeri* varies in color, so that certain specimens seem to accord with M. Guenee's comparative description of *sidus* as well as *vinulenta* does. However, I am persuaded that it is more probable that *sidus* is founded on an individual of *vinulenta*, as I at first believed, and I only wait some more positive data to restore the name. It is necessary for the purpose to compare M. Guenee's type. The N. Am. species are then as follows :

Pettiti Grote, *Graefiana* Grote, *ceromatica* Grote, *vinulenta* Grote (= *sidus?*), *Walkeri* Grote, *Morrisoni* Grote, *devia* Grote. No species are yet known from California.

Litholomia, n. g.

In the shape of the primaries there is a marked resemblance to *Lithophane* and *Scopelosoma*, the costal margin being straight. The inner margin is straight and nearly as long as the costal, the exterior margin being slightly and evenly rounded ; the wing is nearly of an even width throughout. The tibiæ are unarmed. The eyes are naked, lengthily lashed. The head is sunken, or oppressed. The male antennae simple, ciliate beneath. The thorax is somewhat rounded and full, approaching *Lithomia*, not quadrate as in *Lithophane* and *Calocampa*. The abdomen is untufted, somewhat flattened, with a dorsal carina, not as rounded as in *Lithomia*. The palpi are short, not exceeding the front. Ornamentation like *Lithophane* and allied genera.

Litholomia napaea.

Antennae white at the base. Cinereous ; markings distinct. Lines double, black, distinct, perpendicular. T. a. line thrice waved, component lines divaricate, equally distinct. Orbicular shaded with white,

ill defined, below it a very narrow line descends towards internal margin beyond; the distinct, slightly waved, broad, median shade line crosses the wing; this line is accompanied by a diffuse shading which in one specimen is tinged with ferruginous. Reniform filled with blackish, forming a larger rounded inferior spot. T. p. line nearly perpendicular, very slightly exserted opposite the cell, the inner line extending outwardly dentatedly on the veins. Subterminal line irregular, whitish, preceded by a blackish shading, denticulate. An even black terminal line, obsoletely interrupted; fringes even, gray, dotted with blackish. Secondaries blackish fuscous with paler fringes. Beneath paler fuscous, with blackish discal spot and median, irregular, denticulate line; on fore wings the median line is distinctly and broadly inaugurated in deep black, near the discal mark, but afterwards becomes obsolete; terminal space paler than the rest of the wing. Collar with a black line above; behind, on the dorsum are two more faint lines across the base of the tegulae.

Expanse 27 m. m. *Hab.* St. Catherines, Mr. Geo. Norman, No. 226, 1115; Quebec, M. Bélanger.

Identified by Mr. Morrison, from a photograph, as his *Scopelosoma napaea.*

AGROTIS RUBIFERA, N. S.

BY A. R. GROTE, BUFFALO, N. Y.

Allied to *rubi* and *conflua.* Taken by Mr. Norman in Canada, and considered to be identical with the European *rubi* in former writings. Abdomen and hind wings paler than in *conflua.* Fore wings of a darker purply-reddish brown; t. a. line geminate, a black spot before the orbicular and usually the disc between the spots is black stained. Claviform indicated. Subterminal pale, more waved, but like *conflua*, differing from *rubi;* beneath the common line is not diffuse as in *conflua.* Thorax darker than fore wings, with front and palpal tips pale. *Expanse* 28 m.m.

Dr. Speyer, to whom I sent a specimen, regards the species as different from *rubi*, but finds no characters to separate the European *Xanthia togata* from a N. A. specimen determined as this latter species, sent to him at the same time.

LEPIDOPTERA COLLECTED AT GODBOUT RIVER, NORTH SHORE OF THE ST. LAWRENCE, DURING THE SEASONS OF 1874–75.

BY NAPOLEON CORNEAU, RESIDENT.

Papilio brevicauda *Saunders*.....9th June, rare.
" turnus *Linn*.....20th June, rare.
Pieris rapæ *Linn*.....26th June, rare.
" borealis *Scudder*.....22nd June, uncommon.
Colias interior *Scudder*.....15th July, rare.
" philodice *Godt*.....14th July, rare.
Vanessa antiopa *Linn*.....2nd June, common.
" J-album *Bois*.....22nd Sept., rare.
" Milberti *Godt*.....29th May, rare.
Pyrameis atalanta *Linn*.....5th July, common.
" huntera *Smith*.....15th July, rare.
" cardui *Linn*.....24th June, rare.
Argynnis atlantis.....15th July, common.
" myrina.....7th July, rare.
" bellona.....8th June, rare.
Melitaea tharos var. Batesii.....16th July, common.
Limenitis arthemis *Godt*.....15th July, common.
Grapta progne.....29th May, rare.
Lycaena lucia *Kirb*.....11th June, common.
Glaucopsyche Couperi *Grote*.....23rd June, common.
Hesperia mandan *Edw*.....July, rare.

Good specimens of the above can be obtained from William Couper, 67 Bonaventure Street, Montreal.

NOTES ON THE LARVA OF CATOCALA ILIA, Cram.

BY F. B. CAULFIELD, MONTREAL, P. Q.

On June 15th, 1874, Mr. Wm. Couper, while collecting on Montreal Mountain, found a larva on Oak, which he kindly gave to me. It appeared fully grown, and was a little over two inches in length.

Body onisciform ; general color, gray. Head heart-shaped, strongly bilobed, pale green, with white blotches, twelve short black hairs in front, and near the top of the head there are four small tubercles of a white color, each of which is tipped with a black hair ; head surrounded with a broken border of dark streaks. Upper surface greenish gray, with an interrupted dorsal band of delicate blue gray spots, the whole minutely spotted with black. On the second segment are twelve small white hairs, four on fourth, fifth and sixth, six on seventh, four, on eighth to twelfth, six on thirteenth. Sides delicate blue gray, marbled with spots of green and black, with a broken lateral band of a green color ; spiracles yellowish white, with a black ring ; behind each is a large wart tipped with a black hair. A fringe of short white fleshy filaments close to under surface. Under surface pink, with a row of transverse black spots, larger and darker on the middle segments. Feet and prolegs grayish white, spotted with green and black.

This larva was very sluggish during the day, but would fling itself about in a frantic manner if touched ; at night it was very restless, creeping about the box continually. It fed freely on Oak.

Spun up in a leaf June 18th, 1874. Imago emerged latter end of July, 1874, and proved to be *Catocala ilia* Cram.

TINEINA FROM CANADA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from p. 147.)

GELECHIA.

G. albomaculella. N. sp.

A single specimen with the palpi broken off. Head pale yellowish tinged with fuscous. Thorax brown, with the apex whitish. Fore wings gray brown, under the lens appearing yellowish white and brown in irregular blotches, with a distinct white spot on the fold at about the basal fourth, the usual opposite white costal and dorsal spots at the beginning of the ciliae, a small white spot at the apex, and two others at the base of the dorsal ciliae. Ciliae sordid white, with a narrow brown hinder marginal line about their middle. Legs and abdomen beneath irregularly blotched with yellowish gray and dark brown. *Al. ex.* 1⅛ inch.

G. niveopulvella. N. sp.

Palpi simple; third joint slender and longer than the second, dark brown; the second hoary at the tip; the third whitish on the upper surface at the base. Head brown, dusted with white, with a row of white scales across the forehead between the eyes. Antennae brown. Thorax brown, densely dusted with white, especially about the middle, where the white prevails. To the eye the fore wings appear very dark brown, with a white spot on the disc before the middle and two or three small ones behind the middle, and an irregular white fascia posteriorly angulated at the beginning of the ciliae; under the lens the wing appears to be pretty densely dusted with white and the spots are only aggregations of the dusting. Under surface and legs irregularly marked with dark brown and gray, and the tarsi are annulate with white. *Al. ex.* $\frac{13}{16}$ inch.

G. bicristatella. N. sp.

Palpi simple, second joint as long as third, and white on the inner surface and tip; outer surface dark brown; third joint ochreous, with a dark brown annulus about the middle. Antennae ochreous, annulate with brown. Fore wings pale ochreous, dusted and suffused with brown. There is an oblong tuft of dark brown raised scales on the fold, and a short brown streak between it and the dorsal margin. Another tuft of brown scales at the end of the cell, and the apical part of the wing is dark brown. Ciliae stramineous, with a narrow brown hinder marginal line about the middle of those of the dorsal margin. *Al. ex.* $\frac{9}{16}$ inch.

G. Belangerella. N. sp.

Second joint of the palpi a little swollen towards the apex, and the third as long as the second: second joint pale gray, third pale ochreous with a brown annulus before the middle and another before the tip. Head gray. Antennae brown. Thorax and fore wings gray, with a dark brown streak along the fold and two or three small spots about the middle of the wing and two more at the end of the cell slightly raised above the surface. There is a row of eight blackish spots around the apex. Hind wings somewhat sinuate beneath the tip, pale grayish fuscous. Legs dark brown; tarsi annulate with white. *Al. ex.* $\frac{9}{16}$ inch.

LEUCOPHRYNE., *gen. nov.*

Second joint of the labial palpi three times as long as the short conical third joint; the second joint projects nearly straight in front of the

head, and is clothed with loose, somewhat spreading scales at its apex, but can scarcely be called tufted; the third joint is slightly recurved. No maxillary palpi; tongue scaled and of moderate length. Face full, wider than long, somewhat retreating. Eyes globose, moderate. Vertex short. Antennae simple (as in *Gelechia*).

Fore wings lanceolate. Cell rather narrow, closed. Four marginal veins proceed to the costal margin, the first from about the middle of the cell and much longer than the others, which proceed from the apical part of the cell, the fourth being furcate on the costa before the apex; the median sends four branches to the dorsal margin, the last of which attains the margin near the apex, opposite to the last subcostal marginal vein; submedian furcate at the base; the costal attains the margin before the middle. There is nothing in the fore wings to separate it from *Gelechia*.

Hind wings lanceolate, narrower than the fore wings, resembling in form and neuration the wings of *Holcocera*, and yet more those of *Plutella cruciferarum*. The costal vein attains the margin before the middle: the subcostal proceeds straight to the margin before the apex: the discal vein does not touch the subcostal, but terminates at its superior branch, which behind the end of the cell is connected with the subcostal by a very short transverse veinlet, immediately behind which it becomes furcate, delivering both branches to the dorsal margin before the middle; anteriorly it runs through the cell, parallel and close to the subcostal, but becomes obsolete before it reaches the middle of the cell. The median is three-branched and rounds gradually into the discal, which rounds up anteriorly to its superior branch. Submedian distinct.

L. tricristatella. N. sp.

Palpi reddish brown, sparsely dusted with white, which forms three very narrow and indistinct annulations on the third joint. Face pale yellowish, iridescent. Head and thorax reddish brown. Patagia and basal portion of the dorsal margin of fore wings ochreous yellow, with a small reddish brown tuft within the dorsal margin of the wing, not far from the base; remainder of the wing dark reddish brown, with a large erect tuft on the fold about midway the length of the wing, and a transverse tuft covering the discal vein. Ciliae of mixed brown and whitish scales, and paler than the wing. Legs brown, the tarsi annulate with whitish. The posterior tibiae with a whitish spot about the middle of the outer surface and the tip white. *Al. ex.* 3/4 inch.

TINEA.

T. marmorella. N. sp.

Head and palpi yellowish white; the second joint of the palpi brown on the outer surface. Thorax and fore wings white, marbled with dark brown spots, which are confluent, the basal fifth being white, except a brown spot on the base of the costa, one on the base of the dorsal margin, one on the fold and one between it and the dorsal margin; in the remainder of the wing the brown prevails; one of these dark brown spots is on the costa before the middle and reaches the fold, and another about the middle of the costa does not quite reach the fold, and behind it along the costa and around the apex is a row of distinct and separate dark brown spots, five of which are on the costal margin. There is a dark brown hinder marginal line extending through the middle of the dorsal ciliae, and the ciliae behind it are dusted with black. *Al. ex.* $\frac{3}{8}$ inch.

T. minutipulvella. N. sp.

Outer surface of the second joint of the palpi dark brown. Palpi otherwise and the head white, with a sordid brownish spot between the antennae. Antennae yellowish white, annulate with brown. Thorax and fore wings white, minutely but distinctly dusted with pale brown, the dusting along the costa aggregated into minute brown spots, and also along the base of the dorsal ciliae, which are white flecked with pale brown. Hind wings grayish fuscous. Dorsal surface of the abdomen grayish brown, with a distinct dark brown line along each side. Under surface whitish; tip pale sulphur yellow. Legs brown on their anterior surfaces, whitish behind and the tarsi annulate with white. *Al. ex.* $\frac{6}{8}$ inch.

T. marginimaculella. N. sp.

Outer surface of the palpi brown; inner surface and face white; vertex pale sulphur yellow, or, perhaps, rather deep stramineous. Maxillary palpi grayish white. Antennae silvery gray. Thorax and base of the costal portion of the wing brown, that color also being extended as a streak or series of spots along the fold to the dorsal margin and at the base of the dorsal ciliae. There are four brown spots on the costal margin, the last of which is placed at the beginning of the ciliae, and a row of brown spots extends at the base of the ciliae entirely around the apex; there is a dark brown spot on the middle of the disc and another at the end of the cell. Ciliae and hind wings silvery pale gray. Abdo-

men brown, the apex silvery. The first pair of legs is brown on the anterior surface, and the tarsi are annulate with white. Middle and hind legs silvery gray. *Al. ex.* ½ inch.

In former pages of this journal I have described a few other species from Canada among species from the United States. In all of these instances the *habitat* is given, except in the single instance of *Œcophora boreasella*, where I find that I have omitted it. The single specimen from which it was described was unfortunately destroyed while under examination. It was received from Mr. Saunders, Editor of this journal, and was labelled No. 399. I do not know whether Mr. Saunders has other specimens or not.

(The specimen sent Mr. Chambers was the only one in my possession.—W. S.)

NOTES ON AN INTERESTING EASTERN VARIETY OF ONCOCNEMIS CHANDLERI.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Mr. Fred. Tepper has just sent me for examination a very interesting pair of insects taken on the sea shore of Long Island, which approach so nearly the type of *O. chandleri* in my collection from the mountains of Colorado, that I cannot separate them specifically, although there are certain differences, which I give below. The capture is the more valuable since the species of *Oncocnemis*, so far as known, inhabit only the mountains of Europe, Siberia, Colorado and California.

I propose the name *riparia* for this form, and in case the study of larger series of specimens should show it to be a good species, that name can be retained for it.

The principal difference between the insects is in the color of the posterior wings; in *chandleri* ♂ they are white with a broad black even border; in *riparia* ♂ they are entirely white, except that the veinlets are stained with black and there is a slight gray shading at the costal angle; this difference is seen still more distinctly beneath, and then on the anterior wings as well. The posterior wings of *riparia* ♀ above have a dark gray-black border, but beneath they are white as in the male.

In the Coloradan species the outer surface of all the tarsi is checked with black and white; in the Long Island one these markings are almost entirely obsolete. The markings of the anterior wings of the former species are more prominent and better defined, the ordinary spots are not so elongate, and are united by a short, thick neck, and the basal dash is shorter and thicker; otherwise the markings are much the same.

The female of *riparia* presents a curious structure of the end of the abdomen, perhaps for the purpose of retaining the male; the end of the abdomen is bare of scales, but near the tip there is a ring of rather long hairs, followed by a ring of stout curved spines; such a structure is, so far as I know, unique in the Noctuidæ.

I have not been able to observe the female of *chandleri*, so that I do not know whether it is armed in the same way.

DESCRIPTIONS AND NOTES ON THE NOCTUIDÆ.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Agrotis decolor Morr.

Proc. Boston Soc. Nat. Hist., vol. 17, p. 162.

Agrotis campestris Grote.

Can. Ent., Oct., 1875.

Having received many additional specimens of this species, I am able to give below a fuller description than my original one, and to compare it with its two allies, *geniculata* Grote and *tessellata* Harr.

A. decolor can at once be distinguished from *tessellata* by the dark purple ground color, frequently overspread in the median and basal spaces with cinereous, and by the absence of any gray tint; from *geniculata* the best character which I have observed to separate it is the color of the thorax, which in *decolor* is brown, having usually the prothoracic and metathoracic tufts yellow, and having always a yellow spot at the base of the tegulæ; in the former the thorax is simply cinereous and black.

The following are its characters drawn from a large series of specimens from Maine, Canada, New Hampshire, New York and Massachusetts:

Tibiæ spinose. Collar with a lobate central black line. Thorax usually brown, lighter than the wings, having frequently an anterior furrowed tuft and always a posterior tuft. Abdomen smooth, rounded, with the ovipositor of the female slightly exserted. Color of the anterior wings very variable, usually brown with a distinct purple tinge, occasionally the basal and median spaces are suffused with cinereous, and then the subterminal and terminal are dark and contrasting; in other specimens the wings are entirely purple black, in others purple brown, in still others the median space is dark purple brown and the basal and subterminal space bright even yellowish brown; this seems to be the most common form. The ordinary lines are distinct, black and geminate; the usual spots are shaped as in *tessellata*, the space between them is usually filled with black; a black line at the base of the fringe.

Posterior wings whitish or light gray, with a broad, black, marginal band; in the males this band is even and well defined; in the females usually suffuse.

Expanse 30–37 m. m.

I regard this as a northern mountainous species, belonging to the Canadian fauna.

Caradrina meralis, nov. sp.

Expanse 31 m. m. Length of body 13 m. m.

This is a comparatively stout, inconspicuously marked species, differing materially from *meskei*, *miranda* and *tarda*, the other species of the genus. Eyes naked. Tibiæ unarmed. Palpi black, tipped with white. Antennæ of the male pubescent. Front, vertex, collar and thorax gray. Abdomen untufted. Anterior wings grayish white; the markings black and quite faint; traces of the half-line; the interior line faint, oblique; exterior line rounded, obsoletely dentate; orbicular spot reduced to a black dot, the reniform forming a conspicuous luniform black mark; subterminal line absent; a partially obsolete series of black dots at the base of the fringes.

Posterior wings white, immaculate, except that the discal dot shows through from below.

Beneath gray, the anterior wings suffused with black, strong discal dots and a common median line, best marked on the costa.

Hab. Maine. Collection H. K. Morrison.

Hadena fibulata Morr.

Bull. Buff. S. N. S., 1874.

I have specimens of this species from Maine and Canada, which offer considerable variation; it is probable that it should be referred to *Hadena* rather than *Dryobota*; it seems to be in a measure intermediate between the two genera.

Hadena norna, nov. sp.

Expanse 23 m. m. Length of body 15 m. m.

This is one of the small, slender species of *Hadena*, belonging to the little sub-genus *Oligia*, as defined by Mr. Grote.

Eyes naked. Antennæ simple. Thorax and abdomen smooth and untufted. Anterior wings light brown, shaded with darker brown in the basal, terminal and central portion of the median spaces; sub-basal space light; interior line simple, fine and distinct, forming three prominent lobes; orbicular spot absent; reniform present, situated in the centre of the median dark space, white and strongly contrasting; exterior line also simple and distinct, incepted on the costa before the reniform; a distinct costal shade before the inconspicuous subterminal line; a black line at the base of the fringe. Posterior wings yellowish gray, with a fine median line. Beneath the anterior wings are blackish, except along the costa and inner margin; the posterior wings are yellowish, both with a median line and the latter with a terminal shade. *Hab.* Maine. Coll. H. K. Morrison.

Easily separated from its allies by the conspicuous white reniform spot.

GRAPTA SATYRUS (Edwards).

BY C. W. PEARSON, MONTREAL, QUE.

On Dominion Day, while at Chateauguay Basin, I collected a number of larvæ which were found feeding on nettle. I secured them in my larva box, and took a quantity of the food-plant with me. When I reached home in the evening I was too busy to examine them carefully, and the next day I found that quite a lot of them had changed to chrysalids.

Among those that had not changed were a couple of *P. atalanta*, and the rest were all *V. Milberti*, a great many of which were infested with parasites, and in a few days all that escaped these foes had changed. In about ten or twelve days they began to emerge, and on opening the box on the 13th, I was much surprised to find one specimen of this beautiful *Grapta* hanging from the empty case. I did not know what it was until I compared it with an example from California. On the 15th also, along with several specimens of *Milberti*, I found another in the box, and comparing both of them with my example from California, I cannot find any difference except that they are in better order. Chateauguay Basin is about fifteen miles south of here, and has never been visited much by collectors, but we have recorded from that locality three insects which have never been taken here (Montreal), viz., *A. bellona* and *E. columbina*, taken by Mr. Jack, and *G. satyrus*, taken by myself.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The fifth annual meeting of the above society was held, according to announcement, in the Court House, in the City of Ottawa, Ontario, on the 22nd day of September, 1875, at 3 p. m. The reports of the officers were read, and a copy of the President's address promised to be placed at the disposal of the printing committee for publication.

The following officers for the ensuing year were then elected :

President—W. Saunders, London ; *Vice-President*—Rev'd C. J. S. Bethune, M. A., Port Hope ; *Secretary-Treasurer*—J. H. McMechan, London. *Council*—Wm. Couper, Montreal ; R. V. Rogers, Kingston : J. Pettit, Grimsby ; J. M. Denton and E. Baynes Reed, London. *Editor of Entomologist*—W. Saunders. *Editing Committee*—Rev'd C. J. S. Bethune, M. A.; G. J. Bowles, Montreal ; E. Baynes Reed. *Library Committee*—W. Saunders, E. Baynes Reed and J. H. McMechan. *Committee on Centennial Exhibition*—W. Saunders, Rev'd C. J. S. Bethune, M. A., J. H. McMechan. *Auditors*—G. Geddes, Chas. Chapman, London.

The various reports of the officers and from the Branches of the Society will be found in the forthcoming Annual Report.

THE USEFULNESS OF SPIDERS.

BY JOHN C. JACK, HILLSIDE, CHATEAUGUAY BASIN, Q.

I have often wondered why people have such a dislike for spiders, and why, instead of killing, they are not placed upon trees and plants, for they are exceedingly fond of a great many insects injurious to vegetation. I have seen them very busy devouring the interior of a chrysalis of Clisiocampa, and in winter, when out of doors, they generally hybernate under the loose bark of trees, in which case all the beetles and chrysalids in the vicinity are sure to be found destroyed, only the shells remaining. I notice that the Lady-birds (Coccinella) hybernate beside them in safety, and are never destroyed, living even within their webs. Whether this is a natural taste of the spider or an instinct I can only leave for Entomologists to determine; the fact however remains.

It is well to encourage any insect that can destroy the Clisiocampa, which is likely to cause great mischief the coming season if not destroyed in the rings. In our orchard of 1000 trees, my brothers and I have, after school hours, gathered by actual count about 8000 rings, and still can take off two or three hundred in an hour's time. We are paid a cent per dozen by father, and think it a good thing. The youngest boy is only five years old, and he has frequently gathered 60 or 70 rings after school, even in the short winter afternoons. "Eternal vigilance is the price of" —apples.

MISCELLANEOUS.

Correction and Errata. The following was received from Mr. W. H. Edwards too late for insertion in our last number: "After the mss. of my paper was sent to the printer, I discovered that I had overlooked the fact that *myrina* is expressly enumerated by Hübner under his coitus *Argynnis*. Also, in reference to the same paper, the following errata: Page 193, lines 14 and 17, for 'class' read 'clan.'"

Pterophorus periscelidactylus.—On the morning of the 31st October, while the thermometer was several degrees below freezing, I captured a healthy specimen of this species. Was not that very late for it?—R. Vashan Rogers.

Mr. J. M. Grant, of Crowelton, Buffalo, W. Nebraska, desires to arrange some exchanges with Entomologists in Ontario or Quebec. Parties desiring to exchange will please write him.

Mr. T. G. Schanpp, 25 Broadway, Brooklyn, E. D., N. Y., has many duplicates in Coleoptera from New York, Texas, Louisiana, Florida, &c., which he desires to exchange for specimens from the north; collects only in Cicindelidæ and Carabidæ.

Mr. W. V. Andrews, 36 Boerum Place, Brooklyn, N. Y., has a number of European, Australian and New Zealand Coleoptera, which he wishes to exchange for species purely Canadian or Arctic.

Mr. George P. Cooper, of Topeka, Kansas, has a large number of Western insects, which he would be glad to exchange for Canadian insects.

BOOK NOTICES.

Remarks on Canker Worms and Description of a New Genus of Phalaenidæ, by Chas. V. Riley, 8vo., 8 pp., with eight wood-cuts. Through the kindness of the author we have been supplied with an advanced copy of the above paper, in which the many points of difference between *vernata* and *pometaria* are clearly pointed out; the differences in structure being sufficiently great to require, in the author's opinion, the erection of a new genus for *vernata*.

The Lepidopterist's Calendar, by Joseph Merrin, second edition, price 3s. 6d., published by H. Marsden, Gloucester, England. This is an excellent little work of 250 pages, giving the time when the various species of British Lepidoptera appear in the egg, larval, pupal and imago states, with the food plant and habitat, all thoroughly worked up to the present time. Mr. Marsden has appointed Mr. W. V. Andrews, 36 Boerum Place, Brooklyn, N. Y., as his American agent for the sale of this work.

Bulletin of the Buffalo Society of Natural Sciences, Vol. iii, No. 1. Contains Description of a New Crustacean, already referred to in our

August No.; a paper on Texan Lepidoptera, by Dr. Leon F. Harvey; on New species of Eusarcus and Pterygotus, by A. R. Grote and W. H. Pitt, and Part II of Synopsis of Fungi of the United States, by M. C. Cooke, M. A.

The Structure and Transformations of *Eumaeus atala*, by Samuel H. Scudder, 4to, 8 pp., with one excellent lithographic plate, from the Memoirs Bost. Soc. Nat. Hist. Notice of the Butterflies and Orthoptera collected by Geo. M. Dawson, as Naturalist of the B. N. A. Boundary Commission, 8vo, pp. 5, by Samuel H. Scudder. We tender the author our sincere thanks for copies of the above valuable papers.

The Scientific Monthly—a magazine devoted to the Natural Sciences; E. H. Fitch, Editor and Proprietor, Toledo, Ohio, Vol. 1, No. 1. This new claimant for public favor is an 8vo journal of 48 pages (the first number, owing to an accident, is only 40 pages). It contains several papers of interest to the Naturalist, among which we would especially mention "First Impressions of the Bird Fauna of California, by Prof. Robert Ridgeway." The subscription price is $3 a year in advance, or 45 cts. a number.

The Cincinnatti Quarterly Journal of Science, Vol. II, No. 4, October, 1875. The October number of this valuable quarterly contains two papers on Entomology, one on the Tineina of Colorado, by our esteemed friend and contributor, V. T. Chambers, of Covington, Kentucky; the other on Lepidopterous Larvae, by A. G. Weatherby. Mr Chambers is at present residing in Colorado, and his paper gives the results of personal observations on the Tineina of Colorado, many of which have been taken at altitudes of from 7,000 to 11,500 feet. In it he gives descriptions of twenty-two new species, besides references to others already described. These were all captured or bred from July 20th to Sept. 1st. Among others, Mr. Chambers has taken in this far distant locality *Œcophora borcasella*, first described from specimens sent to him from London, Ont., by the Editor of this journal, and *Argyresthia goedartella*, hitherto known in this country only from specimens captured at Quebec by M. Belanger, thus proving a very wide range for these tiny creatures.

Canadian Entomologist.—Having had several of the earlier numbers of our journal reprinted, including index for Vol. I, we are now prepared to furnish full sets of our Entomologist, or any back numbers required.

The Canadian Entomologist.

VOL. VII. LONDON, ONT., DECEMBER, 1875. No. 12

LEPIDOPTEROLOGICAL OBSERVATIONS.

BY A. R. GROTE, A. M., BUFFALO, N. Y.

Director of the Museum, Buffalo Society Natural Sciences.

Nola ovilla, n. s.

♂. A small frail form with ciliate antennæ, no ocelli, and long, dependent palpi, their second joint thickly squamous. Fore wings grayish white, with the inner line black, fine, angulated. Outer line denticulate, followed by a pure white shade. A pure white shade in the place of the subterminal. Hind wings dusty white. Beneath the fore wings are pale fuscous, immaculate: hind wings whitish with a discal dot. Expanse 16 m. m. Canada, Mr. Saunders. This species differs decidedly from the N. Am. species described by Prof. Zeller; I do not find descriptions of N. Am. species in any other author.

Dilophonota merianæ Grote.

According to my correspondent, Mr. Meske, this species, formerly known from Cuba and Mexico, has been found in Texas by a collector and examples reared from larvæ. It must therefore be included in the List of our Sphingidæ.

Apatela tritona (Hübn.) Zutr., 107, 108.

Hübner's figure has the t. p. line more irregular and the hind wings more yellowish than the form we consider as intended. *A. grisea*, differs by the white hind wings, and is, *perhaps*, redescribed as *pudorata* by Mr. Morrison in the Annals of the N. Y. Lyceum. No comparison with *grisea* is made of his new species by Mr. Morrison. Specimens of *tritona* show the stigmata, and the inner edge of the reniform is perhaps included with the median shade in Hübner's figure. It is on a line with it in the specimens, which have also the small orbicular very faintly outlined and which latter may be indicated by the two dots in Hübner's figure. On the whole, I cannot see that Guenee's description of *tritona* differs from

my material, and it is not clear that Mr. Morrison has identified a species more nearly resembling Hübner's figure than the ordinary identification of *tritona*.

Apatela grisea (Walk).

I have examined Mr. Walker's types in the British Museum, and I made the note: Fore wings like *tritona*: hind wings white. Professor Bélanger sent me a species which I considered to be this of Walker's. It now appears to me that Mr. Morrison has altered my determination and described the moth as a new species. I think that, until Mr. Walker's species is more satisfactorily identified, my own determination should not be interfered with.

I have since identified several of the species marked unknown to me in the "List" of 1874. A shorter compilation of the "List" is now published. It is no proof that the species is unknown now, that it was at that time. For instance, I have since identified *Schinia gracilenta*, and it seems to me that it is the same as *oleagina* Morr.; in my specimen the subterminal space is a little darker than terminal, as somewhat exaggeratedly shown in Hübner's figure; there is a faint discal discoloration beneath and traces of a subterminal line; the hind wings above are hardly "rosy" along exterior border. My specimen is undoubtedly the same species as Mr. Morrison's, and also came from my old school-friend Mr. Graef. I come to the conclusion that *oleagina* is not a var., but a synonym of *gracilenta*.

Apatela dentata, n. s.

♂. This is allied to *tritona* and *grisea*, but is a smaller species wanting all the black dashes. The ground color is blackish, shaded over with whitish. The lines black, single, denticulate. The claviform is indicated by a slight black mark. Orbicular obsolete. Reniform whitish, rounded, with its outward edge black-lined and shaded. T. a. line running in a little on median vein. T. p. line inaugurated above the reniform, running well outwardly, denticulate throughout its length. Subterminal line hardly apparent: a blackish shade over median nervules on the gray terminal space. Fringes gray preceded by blackish interspaceal markings. Hind wings fuscous, lighter towards the base, with indistinct line. Beneath much paler, irrorate, without discal marks and with a common shaded line.

Expanse 32 m. m. Quebec, Mr. Bowles.

Mamestra Goodelli, n. s.

♀. Resembles at first sight *Hadena misclioides*, but the eyes are hairy, size smaller, and color more brownish. Fore wings shiny reddish brown, with the terminal space and costal region shaded with greenish. Collar greenish, edged with black. Thorax reddish with the tegulae dark margined. Transverse lines geminate, rather indistinct, slightly lunulate: t. p. improminently exserted. Orbicular small: reniform moderate, ill-defined, outwardly shaded with whitish. Subterminal line improminent; no W-mark. Hind wings fuscous with pale fringes; beneath with terminal space of primaries pale. A double exterior shading and discal point on secondaries: primaries fuscous, with the commencement of an angulated exterior line indicated on costal region and obscure discal point. Above the pale pre-apical costal points are noticeable. *Expanse* 30 m. m. Amherst, Mass.; from Mr. L. W. Goodell, after whom I name the species, and numbered 291.

The greenish or olive tintings of this species are difficult to localize and are very slight.

Dianthoecia lustralis, n. s.

♀. Resembles *Mamestra legitima;* allied to *Dianthoecia pensilis.* Lilac gray, the median space shaded with light reddish below median vein and about reniform. Median shade blackish, diffuse. Lines improminent, geminate, the pale included spaces noticeable; t. a. line outwardly exserted, narrowing the median space. Claviform marked by a short black oblique dash. Orbicular small, pale, distinct, rounded. Reniform narrow, pale, with an interior annulus. S. t. line below vein 6 preceded by a carneous shading, and followed by dark scales: inflected below vein 2. Fringes dark, obscurely cut with pale. Hind wings dark fuscous with paler fringes: the median line from beneath reflected. Under surface of hind wings paler than above, showing dot and line; fore wings fuscous with paler terminal space. Collar with a black line. Expanse 30 m. m. Racine (O. Meske).

Anarta promulsa.

Mamestra promulsa Morr., Ann. N. Y. Lyc., 1875, 97.

♂. This is rather a large species for the genus, but its characters are those of *Anarta,* and it is allied to *Anarta nivearia* Grote. A good example is in the collection of the Buffalo Society of Natural Sciences,

received from Mr. Theo. L. Mead and ticketed "20, Colorado." The eyes are hairy; thorax and head shaggily haired without mixture of scales; head improminent; abdomen without tufts; size a little larger than *Anarta subfuscula* Grote, from the same locality, with which species it agrees in the shape of the wings; the tongue is stout. I suppose the hairy eyes induced the reference to *Mamestra*, this, with the other characters, agreeing in reality with *Anarta*.

Lygranthoecia Meskeana, n. s.

Fore wings smooth with the terminal space olive green, the median space light purple and the basal brownish. Median lines geminate with white included spaces; the t. a line straight to median vein, below which it is slightly outwardly rounded; t. p. line sinuate, becoming medially indicated by white dots. Fringes olivaceous. Hind wings black with a band of three light yellow spots; a pale interruption medially along terminal margin; fringes yellowish. Thorax and head olive; abdomen yellow. Legs marked with reddish. Beneath pale yellow, fore wings with a sub-basal triangulate patch, a discal spot and subterminal band black; above the spot and band are vinous costal shades. Hind wings with black discal spot and black subterminal band extended along internal margin and basally within the spot; costal region vinous. *Expanse* 24 m. m. Bastrop Co., Texas, from Mr. O. Meske, to whom I dedicate the beautiful species.

Heliothis lupatus, n. s.

♀. Fore tibiæ with a longer inner and shorter outer terminal claw. Habit of *phlogophagus*. The entire insect is ochreous, stained with a reddish tint. Fore wings with the t. p. line guttate, black points, touched with white; t. a line dentate. Reniform black with white centre; orbicular small, blackish; median shade deeper colored than the wing; the wing deepens outwardly in tone or becomes more orange. The narrow subterminal space is darker. A terminal series of black dots alternated with orange. Fringes plumbeous, contrasting. Hind wings like fore wings, with pale fringes, a small faint discal mark and fine central line; similar beneath, where the fore wings show a large exterior and small interior black discal spot and an indication of an exterior black shade line. *Expanse* 28 m. m. Bastrop Co., Texas, Mr. Meske.

Tarache binocula, n. s.

Allied to *cretata*. Fore wings yellowish white with a perpendicular

median yellow stripe which margins, below the median vein, outwardly, a broad subterminal plumbeous black band, running obliquely to costa before the apex and edged outwardly with a yellowish stain. Terminal space cut by a blackish line. In one specimen the plumbeous band is obsolete and there is nothing on the yellowish white primaries but the perpendicular yellow median stripe, narrowly edged with blackish below median vein, the rounded discal blackish reniform (which in the type is included in the plumbeous color and faintly edged with white) and some yellow apical shadings. Fringes white. Hind wings silvery white with fuscous terminal shade widening at apices. Beneath fore wings fuscous, whitish along costa and internal margin; hind wings white with the costa sometimes a little touched with fuscous and external margin obsoletely lined. Expanse 21 m. m. Texas, Mr. Belfrage, No. 112. Bastrop Co., Mr. Meske.

It has perhaps been confounded with *cretata*. *Cretata* is milk white; *binocula* yellow white, and the coloration of fore wings beneath gives distinguishing characters. The rounded reniform is a noticeable character and allies the moth to *candefacta*, than which it is a stouter species.

Spragueia guttata, n. s.

Allied to *dama* and *leo*, but strongly differing in the detail of the markings. The fringes are orange, touched with black at internal angle opposite the cell (as in *dama*) and at apices. The wing is broken up into sulphur yellow spots by the black lines and ground color. An orange median fascia extends upwardly to the disc before the yellow, black-circled, round reniform, and extends to apices beyond the spot. Internal margin touched with orange at base. Collar and tegulae orange; disc of the thorax yellow, marked out by black inner lines to the patagia and with two plumbeous spots. Hind wings blackish; abdomen zoned with pale yellow, beneath whitish with orange tip. Beneath the wings are blackish with faint lines; on primaries the orange fringes are marked with black as on upper surface. *Expanse* 16 m. m. Bastrop Co., Texas, Mr. Meske.

Spragueia fasciatella, n. s.

Allied to *tortricina* Zeller, and similarly sized, differing by the dull ochreous or paler color of the narrow fore wings, which have black fringes, and by the t. p. line being visible and preceded by a shade of a deeper tint than the ground color; the s. t. line is also preceded by a

similar shade band. Black dots mark the stigmata ; the rounded t. a. line is also followed by a darker shade. Variable in tone and distinctness of the three shade bands. Hind wings and under surface much as in *tortricina*. Texas, Belfrage, Nos. 125 and 126, July 6, 8.

Agrotis turris Grote.

Under this name, which I communicated to Mr. Norman before his leaving for Europe, I drew up the description from Canadian specimens (sent me by Mr. Norman), which has since been published under the determination "Cinereomacula Morr.," in the Proc. of the Phil. Acad. of N. Sciences. I made this alteration in the proofs because Mr. Morrison sent me a specimen of *turris* as his "cinereomacula," previously imperfectly described by him in the Boston Proceedings. Upon Mr. Morrison's request I sent him my specimens. On their return I am surprised to find that he declares his "cinereomacula" to be something different, and returns me my own specimens as *his* types under a *new* ms. name of *his*, thus suppressing my own prior designation for the species which I had previously communicated to him and had only abandoned in consequence of his own determination. The species will be known under the above name of *turris*.

Agrotis mimallonis Grote.

I have, through the kindness of my correspondents, been very recently able to compare my types of this species and *rufipennis* Grote. The names are synonymous, the latter name having been founded on a specimen with obliterate ornamentation. Both specimens are from New York, and I had returned Mr. Mead's type long previously to receiving Mr. Lintner's.

EXPLANATION OF PLATE.

The specimens illustrated on the accompanying Photographic Plate were taken at St. Catherines or Orillia by Mr. George Norman, of Cluny Hill, Forres, Scotland, and are interesting since they are mostly types of new species described in these pages. Their discovery is due to the scientific enthusiasm of Mr. Norman, who has spent two years in Canada to the benefit of Entomological knowledge and the pleasure of his North American friends.

The following is the explanation of Plate 1 :

1. Parastichtis gentilis *(Grote)*. Male type.

2. Parastichtis perbellis *(Grote).* Female type.

A second specimen has been since received from London (Mr. Saunders).

3. Parastichtis minuscula *(Morr.).* Female. Orillia, Mr. Norman.
4. Litholomia napaea *(Morr.).* Orillia.
5. Agrotis friabilis *Grote.* Type.
6. Agrotis campestris *Grote.* Type.

I am informed by Mr. Morrison that this is *Agrotis decolor*, Proc. Bost. S. N. H., 1874, 162. This was not readily perceivable from the remarks of Mr. Morrison, who compared his species with *geniculata* G. & R., whereas *campestris* is very close to *tessellata*. A specimen sent to Mr. Morrison after the Boston paper appeared was returned to me as a "var. of *tessellata*"; and without nearer determination, I accordingly described it, not agreeing with this determination, and am surprised to find it now stated to be "*decolor*."

7. Agrotis (Matuta) Catherina *Grote.* Female type.
8. Agrotis (Pachnobia) Orilliana *Grote.* Female type.

This I am informed is *A. claviformis* l. c. This species belongs to Guenee's genus *Pachnobia*. Its short description in the Boston Proc. was additionally unintelligible, since "*claviformis*" is there compared to *sigmoides*, which latter belongs to a different group.

9. Agrotis versipellis *Grote.* Male type.
10. Apatela subochrea *Grote.* Type.

Allied to the European *salicis*.

11. Oligia versicolor *Grote.* Type.
12. Agrotis badicollis *(Grote).* Male. Orillia.
13. Crocigrapha Normani *Grote.* Type.
14. Agrotis rubifera *Grote.* Type.

I formerly incorrectly determined this last species as the same with the European *rubi*. Dr. Speyer has kindly compared it and finds our species different.

AN ABSTRACT OF DR. AUG. WEISMANN'S PAPER ON "THE SEASONAL-DIMORPHISM OF BUTTERFLIES."

[LEIPZIG, 1875, PUBLISHED BY W. ENGELMANN.]

To which is Appended a Statement of Some Experiments made upon Papilio Ajax.

BY W. H. EDWARDS, COALBURGH, W. VA.

Dr. Weismann has lately published an account of certain experiments made by him during a course of years with a view to determine the facts relating to seasonal-dimorphism, and from them to deduce the reasons for the phenomena. As several North American butterflies are thus dimorphic, I have thought that the substance of Dr. Weismann's paper would be interesting to the readers of the ENTOMOLOGIST, it being too long to print in full. I have therefore written out the following abstract, following as closely as possible the language of the author. I have added a statement of my own experiments with *Papilio ajax*, the results of which confirm the theory advanced by Dr. Weismann as to the causes of the phenomena in question.

The phenomena of seasonal-dimorphism had been known for a long time, and had been established in the case of *Vanessa prorsa* and *levana* early in this century, *prorsa* being the summer, *levana* the winter form. Prof. Zeller ascertained that *Lycaena amyntula* and *L. polysperchon* were summer and winter forms of one species. Dr. Staudinger found *Anthocharis belia* and *ausonia* to have the same relationship. On his interest being excited by these cases, the author instituted experiments. At first he supposed that the difference in the butterflies might be of a secondary nature, having its foundation in the difference of the larvæ, which might be owing to the difference in the food plants of the winter and summer broods. But the most strongly dimorphic butterfly, *levana*, feeds on one plant only, *Urtica major*, and although the larvae show a pronounced dimorphism, the two forms do not alternate with each other, but make their appearance in every generation. He then experimented on the indirect influence of the seasons, but concluded that the cause of the phenomena did not lie here. It must then lie in the direct influence of changing outward conditions of life, those in the winter generation being undoubtedly different from those of the summer generation. There are

two factors from which such an influence might be expected, temperature and length of development, i. e., the duration of the pupa period. The duration of the larva period may be neglected, as this is very little shorter with the winter generation (at least with the species used for experiment). Starting at this point, experiments were made with *levana*. From the eggs of the winter generation, which had emerged as butterflies in April, the author bred larvae, which, immediately after they turned to chrysalids, were put into an ice box, in which the temperature was but 8° to 10° R. (52° Fahr.) It appeared that this temperature was not low enough to have much effect, for when after 34 days the box was taken out of the ice chest, all the butterflies (about 40) had emerged. The experiment succeeded in so far that instead of the *prorsa* form to be expected under ordinary circumstances, most of the butterflies emerged as the so-called *porima*, i. e., as one of the intermediate forms between *prorsa* and *levana*, sometimes taken out of doors, and which more or less resembles *prorsa* in design, but has much yellow like *levana*. In the succeeding experiment the author placed the pupae directly in the ice house, where the temperature was 0 to 1, R. (33° Fahr.), and left them there four weeks. Of twenty butterflies fifteen emerged *porima*, and among these were three which looked exactly like *levana*, except that the narrow blue border line was wanting. Five butterflies of the lot were unchanged, but came out *prorsa*, and therefore were uninfluenced by the cold. From this it appeared that by four weeks of cold down to 0-1 R., a greater part of the butterflies inclined toward the *levana* form, and single individuals arrived at the same almost completely. Should it now not be possible to make the change complete, so that every one should have the *levana* form? But the author never succeeded in bringing this about. There were always some individuals which kept the summer form, others were intermediate, and but a few so changed that they looked like genuine *levanas*.

Experiments succeeded better with some of the Pierides, many of which show the phenomena of seasonal-dimorphism. In *P. napi* the summer and winter forms differ strikingly. Numerous individuals of the summer generation were set in the ice house immediately after becoming chrysalids, the cold being 0-1 R., and were left for three months, then brought (11th Sept.) into the green-house. Between 26th Sept. and 3rd Oct. there emerged 60 butterflies, which, without an exception, bore the characters of the winter form, most even in an uncommonly strong degree. But all did not emerge in the green-house, a part going over the winter, and emerging the winter form the next spring.

The author repeatedly tried the experiment of changing the winter to the summer form by the application of heat, but always failed, and concludes that *it is not possible to constrain the winter generation to embrace the summer form.* He then goes on to state that *levana* has not only two generations in a year, but three, and is polygoneutic (coining a word to indicate the fact whether a species has one, two or more generations: mono-di-poly-goneutic, from goneuo, to produce). A winter generation alternates with two summer generations, and the last of these gives as the fourth generation of the year hybernating pupæ, which in the next April emerge as the first generation, and in the *levana* form. Such pupæ (of the fourth gen.) he many times, immediately on their reaching that stage, placed in the green-house. But the result was always the same; nearly all the pupae hybernated. In one instance only did a *porima* appear among them, all the rest being *levana.* But some of the butterflies emerged in the autumn, after 14 days in pupa. These were always *prorsa* except in one instance of *porima.* From these experiments it appeared that like causes (warmth) have different effects on the different generations of *levana.* With both the summer generations the high temperature induced always the *prorsa* form; with the third this happened but seldom and with single individuals, while the great mass kept the *levana* form unchanged. One might say that this has its foundation in the fact that the third generation has no inclination to hasten its emerging under the influence of warmth, but that by a longer duration of the pupa state must always come out the *levana* form. The cause of different behavior under like influences can lie only in the constitution, the physical nature, of the generation concerned, and not in outside influences. It distinctly appears that cold and warmth cannot be the immediate cause why a pupa emerges *prorsa* or *levana.* The explanation of the facts is given as follows: The *levana* form is the primary original type of the species. The *prorsa* form the secondary, produced by the gradual influence of the summer climate. Where we are able by cold to change individuals of the summer generation into the winter form, this rests upon a reversion to the original form, upon atavism, which, as it appears, is most readily called out by cold, that is, *by means of the same outside influences to which the original form was exposed through a long period of time,* and whose continuance has preserved to this day, to the winter generation, the primitive marking and color. The arising of the *prorsa* form the author imagines to have occurred as follows: it is certain that a so-called ice period existed during the diluvial period in Europe. This

may have spread a true polar climate over our temperate zone, or perhaps a lesser degree of cold may have prevailed, with increased deposition of rain and snow. At all events, the summer was then short and comparatively cool, and the existing butterflies could only produce one generation in a year. They were all monogoneutic; *levana* had but the form of *levana*. When the climate gradually became warmer, a period must have come on in which the summer lasted so long that a second generation could be interpolated. The pupae of the *levana* brood, which had hitherto slept through the long winter, could now during the same summer in which they had hatched as larvae fly as butterflies. Only the brood which proceeded from these last hybernated. There had come to be a state of things in which the first generation grew up under very different climatic influences from the second. So considerable a change as now exists between the *prorsa* and *levana* forms could not have taken place suddenly, but must have done so by degrees. If it did arise suddenly, this would signify that every individual of this species possessed the power to take two different shapes according as it was subjected to warmth or cold. But the experiments have shown that this is not so, that rather the last generation has an ineradicable tendency to take the *levana* form which protracted heat will not alter, while both summer generations have a preponderating tendency towards the *prorsa* form, although they allow themselves frequently to assume the *levana* form in various degrees by lengthened influence of cold.

It seems to the author that the quoted result of his experiments may not only easily be explained by the supposition of a gradual climatic influence, but that this supposition is upon the whole the only admissible one. While by the changes from the ice period to that of our present climate, *levana* altered gradually from a monogoneutic to a digoneutic species, at the same time a sharper dimorphism stamped itself gradually upon it, which only arose through the changing of the summer generation, while the winter generation held fast to the primary shape and marking of the species. When the summer became still longer, a third generation could be interpolated, and the species became polygoneutic, and in this manner, that two summer generations alternated with one winter generation.

The theory explains why at the same time the summer generation was allowed to change, but not the winter one. The last cannot possibly return to the *prorsa* form, because this is much younger than itself. But

when among a hundred cases one appears where a pupa of the winter generation, induced by warmth, completes its change (to *prorsa*) before winter, this is inexplicable. It cannot be atavism which here compels it in the direction of the emergence; but we see from it that the changes in the first two generations have already called forth a certain change in the third, which discovers itself in this, that under favorable circumstances single individuals assume the *prorsa* form. Or, as might also be said, the alternating transmission, which carries with itself the ability to take the *prorsa* form, as a rule remains latent in the winter generation, then with single individuals turns to a continuous transmission. It is true we have as yet no kind of insight into the nature of the process of inheritance, and therein the incompleteness of this explanation is marked, but we still know many of its outward forms of phenomena. We know that one of these forms consists in this, that peculiarities in the father will appear again not in the son, but in the grandson, or even further on; that, too, they may be transmitted latent. Let us suppose a peculiarity should be so transmitted that it always appeared in the first, third and fifth genera tions, and remained latent in the intervening ones. It would not be incredible that the peculiarity should exceptionally, that is, from a cause unknown to us, appear in single individuals of the second or fourth generations. But this agrees with the cases mentioned in which exceptionally single individuals of the winter generation took the *prorsa* form, only with the difference that here a cause—heat—appeared which occasioned the bringing out the latent characters; though in what way it exerts this influence we are unable to say. These exceptions to the rule are no objection to the theory. On the contrary, they give us a hint that where one *prorsa* generation had formed itself, the gradual insertion of a second might be facilitated by the existence of the first. It is not to be doubted that in the open air single individuals of the *prorsa* form sometimes emerge in September or October. But if our summer were lengthened by a month or two, these could lay the foundation of a third summer generation, just as a second is now an accomplished fact.

Dorfmeister (who formerly experimented on the effect of cold on pupae of butterflies) believes that he may conclude that temperature exerts the greatest influence during the turning into chrysalis, but nearly as much shortly after the same period; and this conclusion may be correct in so far as everything depends on whether in the beginning the formative processes in the pupa turned in this or that direction, the final result of which is the *prorsa* or *levana* type. When, however, one or the other

direction has been taken, it may through the influence of temperature be accelerated or retarded, but cannot be any more changed. It is very possible that a period may be fixed at which warmth or cold might be able to divert the original tendency most easily, and it may exist in the first days of the pupa state.

If it be asked why in the analogous experiments with *napi* the reverting was always complete, we may suppose that with this species the summer form has not been so long in existence, and therefore will be more easily abandoned ; or that the difference between the two generations has not become so distinct, which, moreover, indicates that here again the summer form is of younger origin. Or, finally, that the inclination to revert may be quite as great with different species as with different individuals of the same species. But at all events, the facts are confirmed, that all individuals will be moved by cold to a complete reversion. The opinion is expressed in reference to *prorsa*, that in these experiments it does not depend so particularly on what moment of the development the cold is applied, and that differences in the constitution of individuals are much more the cause why the cold brings these pupæ to a complete reversion and those to but a partial one, and has no influence whatever on others. Especially interesting in this relation is the American *Papilio ajax*. This butterfly, similar to the European *podalirius*, appears wherever it is found in three varieties, which are designated as var. *telamonides*, var. *Walshii*, and var. *marcellus*. Edwards has proved by experiments, breeding from the egg, that all three forms belong to the same cycle of development ; of such nature, that the first two appear only in spring and always come only from over-wintering pupae, while the last form, var. *marcellus*, only appears in summer and that in three generations successively. There appears here a seasonal-dimorphism allied to common dimorphism. Winter and summer forms alternate with each other, but the first appears again in two forms, or varieties, *telamonides* and *Walshii*. Omitting for the present this complication, and looking at these winter forms as one, we have four generations, of which the first possesses the winter form ; the three following, on the contrary, the summer form, *marcellus*. The peculiarity of the species lies in this, that with all these summer generations only a part of the pupae emerge after a short time (14 days), but another portion remain the whole summer and the following winter in the pupa sleep, in order to emerge only in the spring, and then always in the winter form. For example, of fifty pupae of the second generation which had formed

chrysalids at the end of June, after fourteen days, forty-five *marcellus* emerged, but five remained over till the next spring and then emerged *telamonides*. The explanation of this fact follows very simply from the above stated theory. According to this the two winter forms must be considered as the primary, but the *marcellus* form as the secondary. But the last is not yet so firmly established as with *prorsa*, where a reverting of the summer generation to the *levana* form is only accomplished through special outside influences; while here there are in every generation single individuals with which the inclination towards reversion is still so strong that the extremest heat of summer is incapable of diverting them from their original hereditary disposition, to accelerate their emerging and to force them to take the *marcellus* form. Here it is indubitable that the old hereditary tendency is not restrained by different outside influences, but wholly by internal causes, for all the larvae and pupae of many different broods were simultaneously exposed to the same outside influences. If it be asked what significance belongs to the duplication of the winter form, it may be answered that the species was already dimorphic at the time when it had but one generation a year. Still this explanation may be gainsaid, for such a dimorphism is not elsewhere known, though indeed some species possess a sexual dimorphism in one sex—the female —as in the case of *Papilio turnus*, which has two forms, but not as is here the case, belonging to both sexes. And therefore perhaps another theory must be advanced. With *levana* we saw the reversion occurring in very different degrees with different individuals; only rarely it reached the genuine *levana* form, generally only succeeding in reaching part way, as far as the so-called *porima* form. Now, it would be at all events astonishing if with *Papilio ajax* the reversion were every where complete, as exactly here the inclination to revert is so different in different individuals. It might therefore be presumed that one of the two winter forms, indeed *telamonides*, is nothing else than an incomplete reverting form, answering to *porima* with *V. levana*. Then *Walshii* only would be the original form of the butterfly, and with this would agree the fact that this variety appears later in the spring than *telamonides*.* Experiments ought to be able to give the explanation. The pupae of the first three generations placed upon ice ought to give for the greater part the *telamonides* form, the lesser portion should be *Walshii*, and only a few, perhaps no individuals should emerge *marcellus*. And this may be assumed to be

* There is an error here, *Walshii* being the earlier form.—E.

the result, from the view that the inclination to revert is great, that even with the first summer generation, which were the longest exposed to the summer climate, always a portion of the pupae, without artificial means, emerged *telamonides*, but another portion *marcellus*. This last will now become *telamonides* by the application of cold; the first, on the contrary, will wholly or in part revert to the original form *Walshii*. One would expect that the second and third generations would revert still more easily, and in greater percentage than the first, because these last had first taken the new form *marcellus*, but from the experiments so far made can no other conclusion be drawn. To be sure, of the first summer generation, only seven pupae out of sixty-seven over-wintered and emerged *telamonides*; while of the second generation forty out of seventy-six over-wintered; of the third twenty-nine out of forty-two. But for closer conclusions more extended experiments will be necessary.

After the experiments so far had, one might still incline to the supposition that through seasonal-dimorphism the outside influences working directly upon single individuals would force upon them one or the other form. But this is not tenable. That cold does not bring one and heat the other form follows from this, that with *ajax* each generation produces both forms. Further, the author often reared the last, or over-wintering generation of *levana* in the warmth of a room, and yet always got the winter form. The length of the pupa period does not determine in individual cases the form of the butterfly, or consequently determine whether the winter or summer form shall emerge, but the length of the pupa period is dependent upon the tendency which the growing butterfly has taken in the pupa. As a rule, the two winter generations of *ajax* emerge only after a pupa period lasting from 150 to 270 days, but single cases occur in which the period is no longer than with the summer form (14 days). With *levana*, too, occurs a similar phenomenon, for not only was the winter form forced to a certain degree by artificial warmth during the pupa period, but the summer generation produced many reverting forms without the period having been at all protracted. The half way reverting form *porima* was known long before any one thought of producing it artificially by the influence of cold. It appears in midsummer on the wing occasionally. * * * * If the explanation, then, is correct, the winter form is the primary and the summer form the secondary, and such individuals as embrace either naturally or artificially the winter form are to be considered as examples of atavism. It appears also that the individuals of a species are influenced by climatic change to

a variable extent, so that the new form is made permanent sooner in one species than in another. From this there must follow a variability of the generations concerned, that is, single individuals of the summer generation must differ more widely in markings and coloring than is the case with those of the winter generation. The facts agree with this as regards *levana*, the winter form being much more constant than the summer, and in this *(prorsa)* it is hard to find two individuals exactly alike.

So far I follow the paper. After reading it I wrote Dr. Weismann as to the peculiarity noticed by me that while out of doors, in the early spring, *Walshii* was abundant, and for some weeks the only form of the species to be met, I had scarcely ever been able to obtain it by breeding, all the over-wintering chrysalids, with one or two exceptions, no matter from which generation, producing *telamonides*. In the Supplementary Notes to Butterflies of N. A., I had given the results of ninety-two over-wintering chrysalids from eggs of many broods of the three forms bred in 1871, and not one *Walshii* appeared, while that same spring, 1872, between the 11th and 29th of April, Mr. Mead, at Coalburgh, had taken sixty-three specimens of *Walshii*, and had taken or seen but one *telamonides*. To this Dr. Weismann replies: "The case of *Walshii* and *telamonides* is indeed very singular and not easy to explain. Nevertheless, I should believe that the ordinary warmth of the room in winter is the cause which prevents the chrysalids acquiring the perfect winter form *Walshii*. The case of *ajax* is more complicated than the other cases of seasonal-dimorphism. It seems now to me possible that not the form *Walshii* is the primary, but *telamonides*. It seems *telamonides* results from all generations. This primary form could have been changed by summer heat into *marcellus*, by winter cold into *Walshii*. But this would pre-suppose that *telamonides* has originated in the south and there resided at the time of the great glaciers."

Following the suggestions of Dr. Weismann, I have made experiments the past season on the chrysalids of *ajax*, having bred from eggs laid by var. *telamonides* the last of May many larvæ, from which resulted between 22nd and 26th June, 122 chrysalids. These as fast as formed were placed on ice in the refrigerator, in small tin boxes, and when all were formed were transferred to a cylindrical tin box, four inches in diameter and six high, and packed away in layers between thin partings of fine shavings. (I used shavings because no better substance was at hand, having found cotton liable to mould when exposed to dampness.) The box was set in a small wooden box, and this was put directly on the ice

and so kept till 20th July. I had then to leave home for a few weeks and sent the box to the ice house, with directions to place it on the surface of the ice. I learned afterwards that this was not done, but that it was set on straw near the ice. By this means the influence of the cold was necessarily modified, and I doubt if the chrysalids within the box, from the manner in which I had packed them, were equally subjected to the cold, those on the outside certainly feeling its full effects, but those in the middle to a less degree, and perhaps so much less as not to have made the experiment of much value so far as they were concerned. I returned on the 20th of August and was informed that the ice in the house had just failed. The chrysalids had been subjected to quite a low temperature, and an equable one, while in the refrigerator for between three and four weeks, but from the defective packing had then probably not felt the cold in an equal degree, and they had been subjected to a lesser degree of cold in the ice house for five weeks longer, which also for some time must have been daily diminishing as the volume of ice decreased. That the severity of the cold was not sufficient to prevent the emerging of the butterflies was apparent when I opened the box, for there were discovered a number of dead ones, which had died as soon as they emerged, the wings being quite unexpanded. I threw out twenty-seven such, besides a number of dead chrysalids, and lamented that my experiment had failed, and that the work would have to be done over again next year. But one butterfly was alive, just from its chrysalis, and this I placed in a box in the house in order that it might expand. Here it remained forgotten till late at night, when I discovered that it was a *telamonides of the most pronounced type*. The experiment had not failed then. Early in the morning I made search for the dead and rejected butterflies, and recovered a few. It was not possible to examine them very closely from the wet and decayed condition they were in, but I was able to discover the broad crimson band which lies above the inner angle of the hind wings, and which is usually lined on its anterior side with white, and is characteristic of either *Walshii* or *telamonides*, but is not found in *marcellus*. And the tip only of the tail being white in *Walshii*, while both tip and sides are white in *telamonides*, enabled me to identify the form as between these two. There certainly were no *Walshii*, but there seemed to be a single *marcellus*, and excepting that all were *telamonides*.

The remaining chrysalids were now kept in a light room, and next day three *telamonides* emerged. By the 4th September fourteen of the same

form in all had emerged, but as yet no *marcellus* or intermediate form After that date a few *telamonides* appeared at intervals up to 20th Sept., but a large proportion of the butterflies, namely, twelve out of twenty-six, between the 4th and 15th were intermediate between *telamonides* and *marcellus*, some approaching one, some the other more nearly. On 4th Sept. the first examples wholly *marcellus* appeared, and one followed on each day, the 6th, 8th, 13th and 15th; from the 15th to the 3rd of Oct. six out of ten were *marcellus*, and two intermediate; a single example between *telamonides* and *Walshii* appeared 3rd Sept., in which the tails were white tipped as in *Walshii*, but in size and other characters it was *telamonides*, though the crimson band might have belonged to either form. Up to the 20th Sept. one or more butterflies emerged daily, on one day, the 4th, eleven; after the 20th single individuals appeared at intervals of from four to six days, and the last was on 16th Oct. So that the whole period of emerging after the box was brought from the ice house was 57 days, and it had commenced some time before that occurred. The natural duration of the chrysalis state in such examples of *ajax* as emerge the first season is only about fourteen days, but in very rare instances in my experience single individuals have emerged after a period of from four to six weeks. In all, 50 butterflies emerged between the 20th August and 8th October, divided as follows:

Telamonides	22.
Between Telamonides and Walshii	1.
Between Telamonides and Marcellus, and nearest the former	7.
Between Telamonides and Marcellus, and nearest the latter	9.
Marcellus	11.

Great uniformity is observable in the size of all these butterflies, their average being that of the ordinary *telamonides*. The examples of *telamonides* especially are strongly marked, the crimson band in a large proportion of them being as conspicuous as is usual in *Walshii*, and the blue lunules near the tail are remarkably large and bright colored. Of the *marcellus*, in addition to the somewhat reduced size, the tails are almost invariably shorter than usual and narrower, and instead of the characteristic single crimson spot, nearly all have two spots, often large. In all these particulars they approach *telamonides*.

To the *telamonides* which emerged after 20th Sept. must be added most of the butterflies which were found dead in the box at that date, and this would bring the number to nearly fifty of that form. There remain of

the original 122 chrysalids (several having died without yielding the imago), 28 chrysalids which are likely to go over the winter. In the experiments recited in But. N. A. as made with chrysalids of *ajax* in the summer of 1871, of several broods of *telamonides* the percentage of butterflies which emerged the same season varied from fifty to sixty, a few dying in chrysalis and the rest over-wintering. In 1870 the proportion of emerging butterflies was larger, but 28 is not an unreasonable number to overwinter out of 122. I conclude, therefore, that the butterflies which have so far emerged this season would naturally have done so, and that the effect of cold has not been to precipitate the emerging of any which would have slept till next spring. And as all which would naturally have emerged this season would have taken the form *marcellus*, the cold has completely changed a large part of these from *marcellus* to *telamonides*, and probably such were from the chrysalids which were subjected to severest cold. The intermediate examples have also changed, but not completely, owing to the lesser degree of cold applied, as before explained; and finally, it seems probable that several chrysalids experienced cold sufficient to retard their emerging and to stunt their growth, but not enough to decidedly change their form. These are the *marcellus*. As to the duration of the chrysalis period, extreme confusion has been produced, so that the emerging, instead of taking place at 14 days after the cold was lessened or withdrawn, as might have been expected, has been protracted through more than two months. In the case of *napi*, as related by Dr. Weismann, where the chrysalids were subjected to cold for three months and then brought into the green-house, the butterflies began to appear in 15 days (or about their natural period), and all that emerged that year did so in the next seven days. In every case the reversion to the winter form was complete; and those chrysalids of the lot which over-wintered all gave the same form in the spring. This it is probable the over-wintering chrysalids of *ajax* will do,—that is, they will give *telamonides* in the spring, and had the degree of cold applied been equal and constant the reversion would probably have been complete. *Telamonides* must be regarded as the primary form of the species. What the position of *Walshii* may be further experiments will perhaps determine.

I append a table showing the dates of emergence of these butterflies:

20th August	1 male		Telamonides.
21st "	1 "	2 females	"
22nd "		1 "	"

24th August..			1 female		Telamonides.
29th " ..	1 male				"
31st " ..			1 "		"
1st Sept.....			1 "		"
2nd " . ..			1 "		"
3rd "			1 "	betw'n Telamonides & Walshii.	
3rd "	1 "				Telamonides.
4th "	4 "		1 "		"
4th "	2 "	medium, n'r'st			"
4th "	2 "	"			Marcellus.
4th "	2 "				"
5th "	1 "		1 "		Telamonides.
5th "	1 "	medium, n'r'st			"
6th "	1 "				Marcellus.
7th "	1 "				Telamonides.
8th "	1 "				Marcellus.
8th "			1 "		Telamonides.
9th "	1 "		1 "	medium, nearest	Marcellus.
13th "	1 "	medium, n'r'st			"
13th "	1 "	"			Telamonides.
13th "	1 "				Marcellus.
14th "	1 "		1 "	medium, nearest	"
14th "	1 "	medium, n'r'st			Telamonides.
15th " . ..	1 "				Marcellus.
16th "			1 "		"
16th "	1 "				Telamonides.
18th "	1 "	medium, n'r'st			Marcellus
19th "			1 "		"
20th "	1 "				Telamonides.
24th "	1 "				Marcellus.
30th "			1 "		"
2nd October.			1 "		"
3rd "			1 "	medium, nearest	Telamonides.
8th "			1 "	"	"
16th "			1 "	"	"

RESULT :

Telamonides.....	22	spec's.	11	male,	11	female.
" partly Walshii..	1	"	....		1	"
Medium, nearest Telamonides	7	"	....	5 male,	1	"
" " Marcellus	9	"	....	6 "	3	"
Marcellus.....	11	"	....	5 "	6	"
	50	"		27 "	22	"

LIST OF SPHINGIDÆ AND ZYGÆNIDÆ OCCURRING ON THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

MACROGLOSSINI.

1. Sesia thysbe Fabr. Not common ; June.
2. Sesia uniformis Gr. & Rob. Not common ; June.
3. Amphion nessus Hubn. Rare ; June and July.

CHŒROCAMPINÆ.

4. Darapsa myron Walk. Common ; June, July.
5. Deilephila chamaenerii Harris. Abundant ; June.

SMERINTHINI.

6. Smerinthus geminatus Say. Not common ; June.
7. " excaecatus Smith. Not uncommon ; June, July.
8. " myops Smith. Very rare.
9. " modestus Harris. Rare.
10. Cressonia juglandis Smith. Not common ; July.

SPHINGINI.

11. Ceratomia amyntor Hubn. Common ; June.
12. Daremma undulosa Walk. Rare.
13. Sphinx chersis Hubn. Common ; June.
14. " drupiferarum Smith. Common ; June, July.
15. " kalmiae Smith. Common ; June, July. I took a specimen of this moth at sugar, July, 1873.
16. " luscitiosa Clem. Very rare ; taken by Mr. Knetzing.
17. " plota Strecker. Rare ; taken by Mr. Knetzing.
18. Agrius eremitus Hubn. Very rare ; taken by Mr. Knetzing.

AEGERIDAE.

1. Aegeria tipuliformis Linn. Not common ; July.
2. " cucurbitae Harris. I was given a specimen of what I take to be this species July, 1875. I unfortunately lost it, and cannot be positive.

Besides these, two other species have been taken here, but are not yet determined.

THYRIDAE.

1. Thyrus maculata Harris. Rare, on bramble blossoms ; June-

ZYGÆNIDAE.

1. Alypia octomaculata Fabr. Not common ; June, July.
2. " Langtonii Couper. Rare ; June.
3. Eudryas unio Hubn. Rare ; July.
4. " grata Fabr. Not uncommon ; July.
5. Scepsis fulvicollis Walk. Very rare ; taken by Messrs. Couper and Pearson ; June, July.
6. Ctenucha virginica Charp. Very common ; end of June, July.
7. Lycomorpha pholus Harris. Not uncommon ; August.

NOTES.—These are all the species that I have seen from this locality. Mr. Knetzing informs me that he found a larva of *Deilephila lineata* Fabr., but did not succeed in rearing it. Mr. Couper was told by a friend last season (1874) that there had been some large caterpillars on a tomato plot in the outskirts of the city. These were probably larvae of *Macrosila quinquemaculata* Haw. I am of opinion that when proper attention has been given to the larval stages of these groups, many species will be added to this list, and many species that we think are rare will prove to be comparatively abundant.

EXCURSION OF THE MONTREAL BRANCH TO CHATEAUGUAY BASIN, ON DOMINION DAY.

BY C. W. PEARSON, MONTREAL, QUE.

Those of the members who accepted Mr. Jack's kind invitation to visit him on Dominion Day, left town on Thursday, the 30th June. by the 5 p. m. train, for Lachine, where they took the boat and had a delightful sail up the Chateauguay River as far as the Basin, where they were met by Mr. Jack, who conducted them to his beautiful residence, where they were warmly welcomed by the rest of his family. After a delicious supper under the shade of the trees, the party amused themselves in pleasant conversation and in preparing sugar for the evening's

work. As soon as it began to get dusk, a large number of trees were sugared, and in a short time afterwards moths began to fly in considerable numbers. After a fair evening's work, the party, after a pleasant conversation on Entomology and other subjects, retired to their respective chambers. In the morning, after having participated of the hospitality of their kind host in an excellent breakfast, they started out to inspect the orchad and grounds, and found everything in the most perfect order and free from insect pests, owing to the perseverance and attention that was paid to the collecting of the Clisiocampa rings: during the winter as many as 10,000 having been taken and destroyed, and after this enormous destruction a careful search was made for the caterpillars in the spring Mr. Jack deserves great praise for his attention to those pests, and I am sure he is amply repaid for his energy.

After a ramble through the orchard, the party started in skirmishing order across the fields. Nothing much was done until they got near the bush, when business began to be lively: quite a number of good things were captured. The morning was spent in the woods and fields, and in spite of a little shower that made the party seek shelter under some of the old trees, everything passed off well. A number of larvae were found feeding on the nettle, which were brought home and from which I have raised a lot of *V. Milberti*, *P. atalanta* and two of *Grapta satyrus*. After scouring the woods till noon, the party made their way back to Hillside, where they were again treated to a sumptuous repast, after which they reluctantly took leave of their kind hostess and started to inspect the Colorado beetle, which is doing great damage there. After examining a number of potato patches without success, we at last came upon the enemy. Only one specimen of the perfect insect was found, but the larvae were there in considerable numbers, and a hateful sight they are, covering the plants with their filthy excrements and stripping the stalks of their foliage. After killing a lot of them and bottling some for curiosity, we proceeded down the road leading through the Indian Reserve. This is a capital ground for a collector; insects of all descriptions abound on every side, and I am sure that if it was properly worked up, would yield a great many rarities.

When we arrived at Caughnawauga we found the boat waiting, and, bidding good-bye to Mr. Jack and thanking him for his extreme kindness, we went on board, and in a short time were landed at Lachine, and thence to Montreal by train, where we arrived about 7 p. m., having enjoyed ourselves thoroughly.

LIST OF LEPIDOPTERA TAKEN AT CHATEAUGUAY BASIN, JUNE 30TH AND JULY 1ST, 1875.

Papilio turnus Linn.
Pieris rapae Linn.
Colias philodice Godart.
Danais archippus Cram.
Argynnis cybele Fab.
" aphrodite.
" myrina.
Phyciodes tharos Boisd. & Lec.
" nycteis.
Grapta comma.
" progne Cram.
Vanessa Milberti Godart.
Pyrameis atalanta Linn.
Limenitis arthemis Drury.
Euptychia eurytus Fab.
Lethe portlandia.
Pararge Boisduvallii Harris.
Lycaena comyntas Godart.
Eudamus tityrus Fab.
Thorybes pylades Scudd.
Hesperia zabulon Boisd.
" leonardus Harris.
" peckius Kirby.
" mystic Scudd.
" taumas.
Ctenucha virginica Charp.
Euchaetes collaris Fitch.
Thyatira expultrix Grote.
Mamestra nimbosa Guen.
Hadena destructor Grote.
" arctica.
" xylinoides Guen.

And several others not yet determined.

BOOK NOTICES.

THE AMERICAN NATURALIST.—This valuable journal has changed hands, and will in future be published by Messrs. H. O. Houghton & Co., Riverside Press, Cambridge, Mass., under the editorial management of A. S. Packard, Jr., assisted by other eminent men of science. The amount of reading matter in each number is to be increased from fifty-six to sixty-four pages.

In addition to much other interesting material, a series of Centennial Articles on botany, zoology, geology and miscroscopy are promised. We bespeak a greatly increased circulation for this valued periodical, and trust that in future its patronage may be in proportion to its great worth. Every naturalist should take it.

Terms 35 cents a number; $4 a year, postage free. We can also offer the following club rates for the *American Naturalist* and CANADIAN ENTOMOLOGIST: $4 gold, $4.50 American currency.

THE CANADIAN

ENTOMOLOGIST.

VOLUME VIII.

Edited by William Saunders,
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ASSISTED BY

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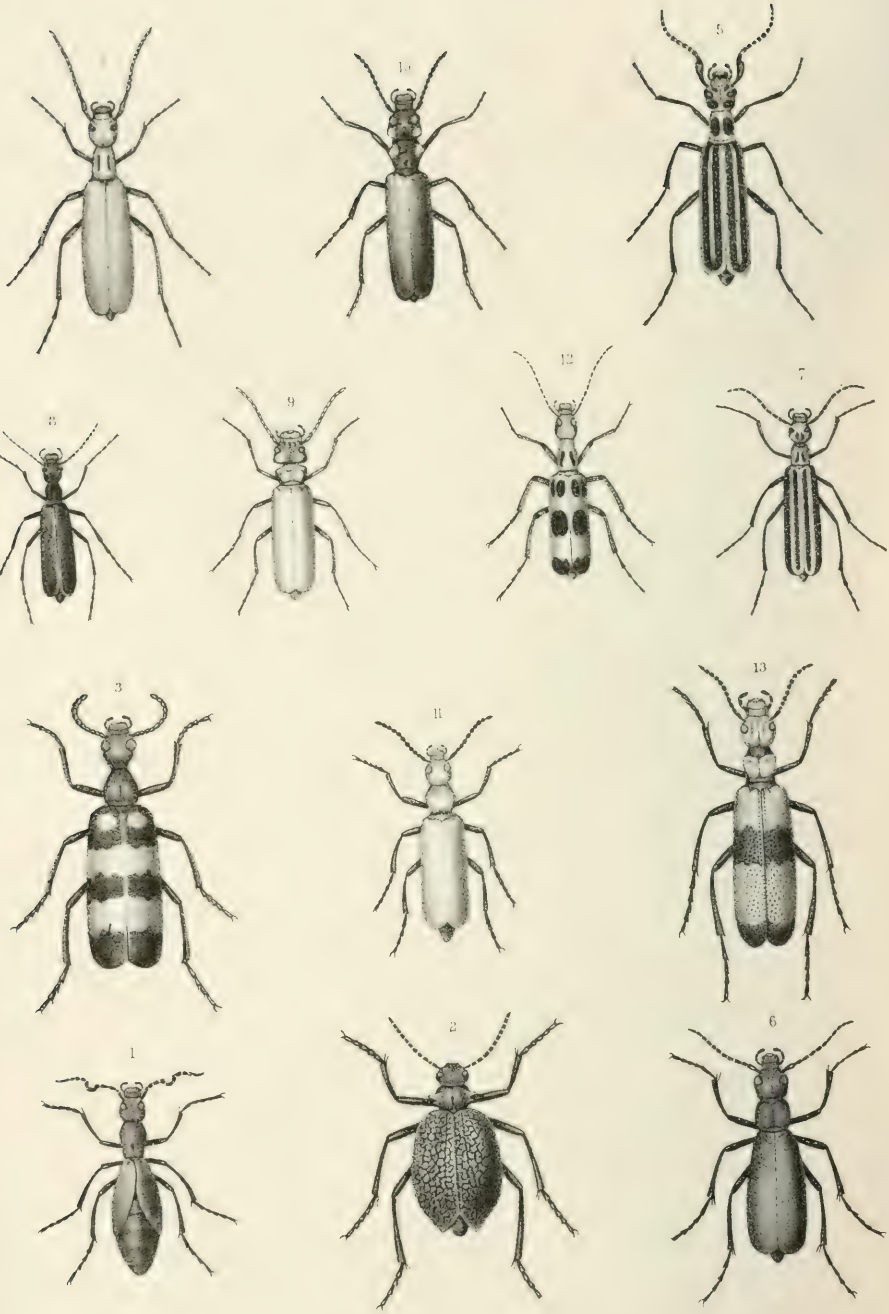

1. Meloe angusticollis Say.
2. Cysteodemus armatus Lec.
3. Mylabris cichorii Linn.
4. Macrobasis albida Say.
5. Macrobasis atrivittata Lec.
6. " " segmentata Say.
7. Epicauta vittata Fab.
8. " " cinerea Forst.
13. Tegrodera erosa Lec.
9. Cantharis vesicatoria Linn.
10. " " vulnerata Lec.
11. " " nuttalli Say.
12. Pyrota mylabrina Chev.

The Canadian Entomologist.

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ANNUAL ADDRESS

OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1875.

To the Members of the Entomological Society of Ontario:—

GENTLEMEN,—For the fifth year in succession I find myself called upon, as your President, to address a few words to you on the condition of our Society, and on the subject of Entomology in general.

With regard to the Society, you have already learnt from the satisfactory Reports of the parent organization and its various Branches, that it continues to go on prospering in a quiet, unostentatious way. While there has been no marked increase to our list of members during the past year, and no performance of any work of unusual importance, yet it is a matter of congratulation that we have no falling off either in numbers or resources to deplore. Much of the inactivity in Entomological matters that has been apparent in this country during the past year may no doubt be ascribed to the prevalent "hardness of the times," which has occasioned—even to those least affected by it—much anxiety of mind, conjoined very often with increased absorption in the cares of business or in the labours necessary for obtaining a livelihood. As you are well aware, we have in Canada but very few persons of assured wealth, who are able, as in older and richer countries, to devote their abundant leisure to literature, art or science. Consequently the condition of things in the world about us deprives most of our members of the leisure, if not also of the inclination, requisite for the successful pursuit of Entomology in any of its various phases. Before another winter opens upon us, however, we have reason to believe that the worst of the present financial storm will be over, and that renewed confidence and prosperity throughout the country will remove the gloom and dulness now oppressing almost every department of work among us. With a revival of business, we may assuredly look for a restoration of activity in scientific pursuits, and hope that our Society, in common with others of a kindred character, may be distinguished by large accessions to its numbers, and by increased work in all its departments.

Last year, at our annual meeting, I took the opportunity of calling your attention to many fields of Entomological labour that are now all but unexplored in this country. May I repeat that there is ample scope for the exertions of all our members, whether they care only to form collections of specimens, or prefer to devote their labours to the unfolding of the life-histories or the study of the classification of insects? There is plenty of work remaining to be done even in the favourite orders of Lepidoptera and Coleoptera, to say nothing of the others that are not so generally studied or collected. It would be a valuable contribution to our store of knowledge were lists of the Canadian species of all orders of insects to be formed, and presented to the Society for publication; and at the same time a revision made of those published some years ago.

But not only is there scientific work of this kind to be performed, which will require generations for its complete achievement; there comes before us at the present moment an extraordinary object for accomplishment during the approaching winter—I allude to the representation of the Society by means of a collection of Canadian insects at the approaching Centennial Exhibition at Philadelphia. You will all, I think, agree with us in the belief that it is a matter of great importance to the Society that it should be brought in this way before the notice of the world, and that it cannot but be of some benefit to the Dominion that its Natural History, as well as its industrial resources, should be fully exhibited. The Council of the Agricultural and Arts Association have already, on our behalf, brought the matter before the Commissioners appointed by the Government, and we understand that a sum of money will be provided to aid us in the satisfactory performance of the work. To gather together a fitting collection of insects, and to prepare them for exhibition, is a task that will strain to the utmost all the resources of the Society. We have commenced the work relying upon the co-operation of you all, and now we trust that every one will help us by the loan of specimens and any other aid that can be afforded. The Society is committed to the task; let us see to it that there be no failure!

Before turning from matters immediately affecting our Society, I may mention that our periodical, THE CANADIAN ENTOMOLOGIST, continues to be maintained with undiminished efficiency and interest, being largely supported and contributed to by our Entomological brethren of the United States; and that the last ANNUAL REPORT presented by the Society to the Legislature has been received with more than usual marks of favour by the press, scientific, agricultural and political, not only in

Canada and the neighbouring States, but also in England; we have been naturally gratified to observe that in many instances copious extracts have been made from its pages, and even a whole article reprinted in an English scientific magazine.

Having referred thus far to our Society and the things that especially concern it, let me now say a few words regarding Entomological matters in general. At the Annual Meeting of the American Association for the Advancement of Science, held in August last, at Detroit, Michigan, the general Entomological Club, organized last year at Hartford, met for the first time. Its sessions, held daily throughout the week of meeting, were remarkably interesting. They were presided over by Dr. LeConte, undoubtedly the greatest of living American Entomologists, and were attended by a great majority of the noted Entomologists of this continent. Our own Society was most efficiently represented by our able Editor, Mr. Saunders; I much regret that the pressure of business matters at home prevented me from accompanying him, as I fully intended to have done. As a complete report of the proceedings is being published in the CANADIAN ENTOMOLOGIST, I need not detain you by any account of them here. Next year the meeting is to be held at Buffalo, N. Y.—a place even more convenient of access for Canadians than Detroit. We trust that a large number of our members will avail themselves of this opportunity—which may not occur again for many years to come—of attending the sessions, and making the personal acquaintance of our American brethren. From past experience I can assure them of a hearty welcome, while no one can doubt that more valuable information can be acquired in a few days in an assemblage of this kind than can be obtained in years of solitary work.

During the season that is now all but brought to a close, there has occurred nothing of a very startling or unexpected character. The Colorado Beetle has continued to extend his ravages throughout our country, but he has been met by such a determined and universal resistance that his work of devastation has been hardly appreciable: certainly in the central portion of this Province we have never had a finer crop of potatoes both as regards quantity and quality. The Cabbage Butterfly (*Pieris rapæ*), to which I also referred last year, has been rapidly extending to the west, and has already become a common object in the neighbourhood of London. So closely, however, does its parasite (*Pteromalus puparum*) follow in its wake, that where a year ago it was most destructive to all its food-plants, it has this season wrought but a

moderate amount of danger. The Locusts, or Grasshoppers, of the West (*Caloptenus spretus*), have continued to commit much havoc, though not by any means on the frightful scale of last year; there is every prospect that the destitution and suffering then occasioned by them will not be repeated to any very great extent this year.

While there has been upon the whole a decided diminution in the amount of loss occasioned by noxious insects during the past year, we have nevertheless to record an increase in the numbers and consequent power for evil, of several common species that are always more or less abundant; among the most notable I may mention the Army Worm (*Leucania unipuncta*), which has wrought much damage in the Maritime Provinces of the Dominion, as well as in some portions of the United States; the two species of Tent-Caterpillars (*Clisiocampa Americana* and *sylvatica*), which have been excessively abundant and destructive to fruit and forest trees in many parts of this Province; and the Pea Weevil (*Bruchus pisi*), which we much fear may soon become—unless measures are taken to prevent it—a source of great loss to our agriculturists. These I mention as having had a more than usual manifestation this year, but I need not detain you with any account of the ordinary work of our insect friends and foes, which are so familiar to every one in this country.

As I mentioned at the outset, you have done me the great honour of electing me your President for five years in succession; while I thank you most cordially for your kindness and consideration so repeatedly shown to me, I feel that it is only reasonable that I should now make way for some one else, who may be able to devote more time and energy to the interests of our Society, and be of more real use to it than I have latterly been capable of. I beg, therefore, to resign into your hands the office that you have so long honoured me with; at the same time I desire to say that I shall continue always to have the welfare of the Society at heart, and that I shall ever be ready and willing to do all that lies in my power to advance its best interests. Again offering you my respectful thanks,

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE.

Trinity College School, Port Hope, September, 1875.

NEW TEXAN MOTHS.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Parasa incisa, n. s.

♂. This species has the fore wings and thorax of a soft brown. The primary is covered by a pea-green patch, which does not reach the margins and is defined outwardly by a narrow dark line running once deeply inwardly below vein 2 and slightly opposite the cell. Hind wings light yellowish. It appears to be allied to *pacnulata* Clem., unknown to me, but differs by the shape of the green patch and in its not being bordered with white. The thorax in *P. chloris* is grass green. Expanse 21 m. m. Bosque Co., Texas (Belfrage, No. 554.)

Eucrythra phasma, n. g. et sp.

♂. The insect is allied to *Spilosoma*, but the head is more prominent, the wings narrower and the antennæ more continuously pectinate. The neuration has not been studied of this form, which is so distinctly marked as to be at once recognized, and which I do not find in authors. White. Fore wings white, crossed by a broad irregular blackish band from base to extremity of veins 3 and 4, where it retains the otherwise white fringes. From apices to middle of external margin a second band diagonally crosses the wing. A discal black spot and traces of an extra basal band. Everywhere, where the blackish color obtains the veins are bright yellow, as is the submedian fold. Body above crimson whitish at base. Thorax and head above white. Squamation about the eyes crimson. Anterior legs fuscous outwardly; palpi fuscous. Beneath, the white secondaries show a dot. Expanse 38 m. m. (May 5, Belfrage, No. 471).

Litodonta, n. g.

Allied to *Heterocampa* of Doubleday. It differs by the antennae being pectinate in both sexes. The thorax is more brushily tufted behind; the head more appressed; the abdomen shorter.

Litodonta hydromeli, n. s.

♂ ♀. Fuscous, overspread with pale green on primaries and thorax. Basal and sub-basal spaces powdered with orange scales: subterminal line followed by orange scales. Lines distinct, widely geminate, sinuate,

sub-lunulate : space beyond the black discal streak clear fuscous. Fringes pale cut with fuscous, opposite the ends of nervules : terminal line distinct. Hind wings pale at base, smoky outwardly ; beneath fuscous, with distinct terminal lines and fringes cut with fuscous. Thorax lined with black on tegulæ and collar. Expanse 34 m. m. May 7, Belfrage, No. 246.

I describe the type of this genus, the only one of the species which has the orange shadings. A paper is being prepared with a plate of the species, which are difficult to separate without illustration.

Aletia hostia, n. s.

Smaller than *argillacea*. It differs by the stigmata being expressed by white dots, of which two super-posed, express the reniform. The ordinary lines are very narrowly white margined, appearing guttate. Hind wings blackish ; fore wings darker than in *argillacea*. The t. p. line is at first sight more distinct than in its common ally. Easily recognized by the above characters. Belfrage, No. 535.

Caradrina conviva, n. s.

A small species of the size of *grata* (*rasilis* Morr.) Palpi black at the sides. Pale yellow brown, or fawn color. Lines dotted. T. p. line widely geminate. Subterminal line a blackish shade. Fringes blackish T. a. line incomplete, strongly dentate. Reniform ill defined : a blackish shade above it on costa indicates the median shade ; a dot indicates the orbicular. Terminal line black, interrupted. Hind wings white, glistening, immaculate, beneath stained along costal region and above here a little tinted. Thorax and head above like fore wings, abdomen pale. Expanse 21 m. m. Belfrage, No. 539.

Mamestra brachiolum, n. s.

♂ ♀. Very near the Californian *M. cuneata* Grote, differing as follows : There are no yellow shades beyond the subterminal line, which is more distinctly waved in the female ; the claviform is present, absent in its ally ; the thorax is purely fuscous and the whole insect darker than in the Californian species ; in the male at least the orbicular is more rounded, the t. p. line is straighter, not inwardly bent below the median vein, hence the lines are inferiorly wider apart than in *cuneata*. Else the two species are very similar. *Expanse* 28 m. m. Belfrage, No. 102. In this species the ovipositor is concealed as in *cuneata*.

Catocala Belfragiana Harvey. Bull. B. S. N. S., 2, 281.

I learn that this species is the same as *C. jocaste* of Mr. Strecker. My paper was read Feb. 5th, and printed in February. I do not think as early a date can be shown for the Number of Mr. Strecker. This species extends to Kansas (Prof. Snow): I have vainly tried to identify it with the unknown *messalina* of Guenée.

NOTES ON BISTON URSARIA WALKER.

BY G. J. BOWLES, MONTREAL, P. Q.

This moth, which is very common in and about Montreal, is described by Walker, in a paper by W. S. d'Urban, published in Vol. 5 of the *Canadian Naturalist* (1860), entitled "A Systematic List of Lepidoptera Collected in the Vicinity of Montreal." It is also taken at Quebec, but I met with only two specimens there during several years' collecting.

The following is the description (of one sex only):

"Male. Dark cinereous, speckled with black, very robust and pilose. Antennae very broadly pectinated. Thorax with three black bands. Legs densely tufted. Fore wings with four black oblique lines, first line bent, second and third approximate, slightly undulating, diverging towards the costa, fourth diffuse. Hind wings with first line obsolete, second and third apparent, fourth indicated by a short broad streak near the interior angle. Length of body 8—9 lines; expanse 22—24 lines."

The female is generally larger, less distinctly marked, and the wings are more transparent. Antennae filiform.

The English species (*B. hirtaria*) stands on our list as a native of Canada, but I have not met with it. The habits of the two species are very similar, and the caterpillars resemble each other closely: indeed, were it not for the difference in color and markings between the perfect insects, they would no doubt be considered identical. The description of the larva of *hirtaria* given by Newman, in his "Natural History of British Moths," would answer equally well for that of *ursaria*, and its

habits are similar to those of the latter. It sometimes occurs about London in such numbers as to strip the trees of their leaves, and the moths are taken in the squares of that city, sometimes twenty or thirty on one tree.

The Champ de Mars, Montreal, is a favorite breeding place of *ursaria*. The Lombardy Poplars growing in this locality are infested with them year after year. In some seasons the trees are partially defoliated by the larvæ, and during the last week of April and the first of May the moths are to be found in great numbers. This year they were a little later than usual. On the 5th May I first observed them, many having just emerged from the pupa, and resting on the tree trunks with unexpanded wings. On the 6th I brought home two females, and placed them in boxes to obtain the eggs. Two days afterwards each had laid about two hundred eggs of a bright green color, globular, and without markings under a low microscopic power. They were .04 in diameter, and laid (in each case) principally in the narrow opening between the lid and side of the box. The female has an ovipositor which can be extended at least a quarter inch, for the purpose, perhaps, of laying her eggs in the interstices of the bark, as they are deposited some time before the leaves expand. About the nineteenth day the eggs changed color, and became steel blue. On the 29th May they began to hatch out, just as the poplars were expanding their leaves. The larvae were very active, and from the first had the peculiar geometric habit of resting now and then with the body extended full length in the air, supported only by the claspers. I turned them out on a young plum tree, and they soon began to feed freely, and grew rapidly. Strange to say, they quickly diminished in numbers, and but few reached maturity.

New-born larva.—.12 inch long, black, head large, with a few whitish hairs; front edge of first segment bordered with white, second and third with white spiracles; next five segments have two white spots on back, one on each side around spiracles, with another white spot below. Legs black; body beneath black.

Mature larva.—2 to 2.50 inches long, general color drab or dingy purple; head of a lighter shade, and spotted with black. First segment bordered in front with a yellow line, indented behind; fourth to eighth inclusive, each with six very small yellow tubercles, two on back, one behind and one below each spiracle. Body striped from head to tail with twelve reddish lines, each bordered on both sides by an irregular

narrow black line; six of the reddish lines are on the back and sides, one (interrupted) through the spiracles, and four on abdomen. Anal segments spotted with black, as also first, second and third segments. Mouth pinkish, legs pink, spotted with black; spiracles dark colored.

It will be seen that the larva changes but little during growth. At the end of July they descend and bury themselves in the earth, changing in a few days to pupae, without forming any case. The pupa is brown, rather stout in form, and furnished at the tail with a small spine, which is generally bifid. It much resembles that of *Amphidasys cognataria*.

NEW SPECIES OF ACRIDINI FROM NEBRASKA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Pezotettix junius, n. s.

Frontal costa slightly sulcate below the ocellus in the ♂. Merely depressed at the ocellus in ♀.

Median carina of pronotum slight, cut by the last transverse incision behind the middle, the anterior part slightly arcuate. Lateral carinæ distinct only on the flat posterior lobe. Pronotum with sides slightly divergent; obtuse angled behind. Elytra cover about two-thirds of the abdomen. Posterior femora as long as abdomen. Last segment in ♂ squarely produced. ♂ cerci broad, short, rounded at tip, slightly curved on upper edge. The lower edge bends upward, making an obtuse angle about the middle, from which point the cerci rapidly decrease in width.

Color of living insect—Varies with age from gray to green. Face and sides of thorax greenish gray. A broad black stripe from eye to last transverse incision of pronotum. Occiput brown. Pronotum brown with green stripe on each side. Antennae red, tips brown. Elytra brown, sometimes yellowish, with a few black dots along the disk. Hind femora light brown, usually with two oblique whitish bands on upper half. Three black spots on upper edge. Tip black. Inner side and lower sulcus light green. Abdomen greenish gray, with a row of large black spots on each side, sometimes forming an almost continuous longi-

tudinal stripe. Abdomen sometimes mottled with black above, is greenish yellow below, with a narrow black line on the last segments below the fold. Sternum and anterior legs tinged with blue. Hind tibiae pale red with black spines. In the male the posterior segments of the abdomen are margined anteriorly with black.

Length of ♀ .90 inch; elytra, .45 inch. Length of ♂ .80; elytra .40. Appears in June at Glencoe, Dodge Co., Nebraska.

Pegotettix autumnalis, n. s.

Frontal costa prominent above, suddenly widened and sulcate at the ocellus. Head unusually large, wider than thorax, occiput very long. Foveola of vertex shallow. Median carina of pronotum slight, cut once behind the middle. Sides of pronotum nearly parallel. Elytra short, oval, pointed. Abdomen rather long and slender, extending beyond the tips of hind femora in ♀. Male cerci nearly straight, broad at base, apical half slender and pointed. Tip of abdomen pointed entire.

Color of dried (not alcoholic) specimens—Face brown, white mottled with brown below clypeus. Cheeks yellow and brown. Antennae rufous. A black stripe from eye to last lobe of pronotum. A yellow spot below the black stripe. Remainder of pronotum brown, hind lobe lightest. Occiput brown margined with yellow. Elytra dark brown, unspotted. Abdomen dark above. Anterior legs yellow, marked with red above. Posterior femora yellow at base, then red on both sides and below, but heavily marked on upper side of exterior face with fuscous. Posterior tibiae blue.

Length of ♀ 1.10 inch; elytra .25 inch. Length of ♂ .85 inch; elytra .203 inch. Glencoe, Nebraska, in September.

Pezotettix alba, n. s.

Form—Frontal costa sulcate, extending across clypeus in living specimens. Foveola of vertex hexagonal, shallow. Median carina of pronotum distinct, cut by last transverse impression back of the middle. Lateral carinæ rounded, nearly parallel. Elytra cross third abdominal segment in ♀. Wings minute. Legs long and slender. Male cerci long and slender. Terminal segment of abdomen entire acuminate. In the male the antennæ are longer than head and pronotum, and the posterior femora pass the abdomen one-fourth of their length.

Color of living insect—♂, vertex, disk of pronotum and legs bright green. Face, abdomen and under side greenish white. Elytra a little

darker. A white stripe from top of eye follows the lateral carinæ to the end of pronotum, and extends obliquely down the side to insertion of posterior femora. Below the white stripe, and running parallel with it, is a broad band of green followed by another white stripe.

Color of ♀ vertex, disk of pronotum and legs white, mottled with green. Rest like ♂, but much whiter. Antennæ light brown.

Length of ♀ .85 inch ; elytra .02 inch. Length of ♂ .65 inch.

Taken in August and September at Glencoe, Dodge Co., Nebraska.

Caloptenus lurida, n. s.

Size and form much like *C. occidentalis* Thos. Frontal costa with slight depression at ocellus, not sulcate. Foveola of vertex shallow, elongate, broadest in ♀. Median carina of pronotum slight, transverse impressions distinct. Lateral carinæ slightly divergent. Antennae longer than head and pronotum. Posterior femora as long as the abdomen. In the male the cerci are broad and flat, considerably curved and armed posteriorly with a rather long and sharp lateral tooth, giving them about the shape of the letter Y. Last ventral segment entire. In color this species, when living, is dark bluish gray. The pronotum and upper part of the head are sometimes lighter and tinged with red. Labrum bright red ; antennae red at base, rest fuscous. Posterior femora light gray, with a longitudinal black stripe the entire length of the disk, and three black spots on the upper edge : the two posterior ones uniting with the black stripe and extending over upon the inner face. Tip black above, red below. Posterior tibiae blood red, with black spines.

In some specimens a light stripe on the side from base of elytra to posterior femora is apparent, but it is usually indistinct. Elytra cinereous darkest at base, with a central row of fuscous spots.

Length of ♂ .85 inch ; of ♀, 1.05 inches.

Habitat. Dodge Co., Nebraska. Time of occurrence, September.

Caloptenus regalis, n. s.

♀. Size medium. Frontal costa prominent ; not sulcate, but depressed at the ocellus. Top of the head raised slightly above the pronotum. Antennae longer than head and thorax. Disk of pronotum gradually ascending toward median carina. Lateral carinae rounded. Pronotum depressed and cut near the middle by the last transverse incision. Hind border obtuse angled.

Color of living insect—Face bluish white, mottled with brown. Cheeks blue, with an oblique darker patch. Eyes prominent, dark brown, hind margins dotted with black lines. Occiput with a triangular black spot, apex forward, bounded on each side by bright yellow. Sides of the thorax margined anteriorly with yellow. A black stripe behind the eye runs backward to the last transverse incision of pronotum. Below this stripe the sides are purplish blue, marked posteriorly with red. Disk of pronotum brown, margined with blue. Elytra gray, darkest at base. Disk white, containing a row of large black spots. Similar but smaller spots unequally distributed over the rest of the elytra. Apex dusky. Wings transparent, with white veins. Posterior femora externally red, with three oblique black bands. Inside and lower sulcus bright red. Upper edge bluish gray, with three broad black patches. Apex gray above, white outside, blue within, and marked with the usual black crescent-shaped patch. Hind tibiae bright blue, with a narrow white annulation near the knee. Tarsi blue above, white below. Anterior legs yellowish, mottled above with blue. Abdomen white, with the anterior part of each segment red, and a small black spot on each side. Beneath bluish white. Antennae light brown.

Length about one inch; length of elytra, .80 inch; length of hind femora, .55 inch. *Habitat* Glencoe, Nebraska. Appears in latter part of June.

SUGARING FOR MOTHS.

BY O. S. WESTCOTT, MAYWOOD, COOK CO., ILL.

The various preparations which have been recommended by different writers seem to be successful enough in attracting nocturnal Lepidoptera, while the poisons employed for quieting them seem to fail in one or more essential particulars. Cyanide of Potassium, whether alone or prepared with Plaster of Paris, does not act with sufficient readiness to prevent strong-bodied moths from fluttering so long as in a great measure to spoil the beauty of their vestiture, while the application of chloroform at night is attended with considerable inconvenience. I have found a plan like the following to work best in practice.

Have not less than four wide-mouthed bottles, two of them of sufficient size to be placed over any Catocala without rubbing him. Have each of these last provided with a large, well-fitting cork, to the bottom of which firmly tack a small piece of sponge. This sponge is to be moderately supplied with chloroform. The other bottles are to be filled for one-fourth of their depth with small fragments of Cyanide of Potassium, thoroughly covered with plaster of Paris in the usual way.

A hunting-coat which is provided with numerous pockets will be found a great convenience, the chloroform bottles occupying the side pockets, and the Cyanide bottles the hip pockets. For the completest success a dark lantern is almost indispensable. This should depend from a strap passed around the waist, so that both hands may be left free for purposes of manipulation. The moths are with no difficulty covered by the chloroform bottle, the effect of the chloroform being almost immediately apparent. Then the moths thus temporarily anaesthetized are transferred to the Cyanide bottles, whose contents complete the work so well begun. The two Cyanide bottles are a great convenience in keeping apart the large and the small specimens, and these being kept constantly in an upright position, the danger of injury from rubbing is reduced nearly to a minimum. The two chloroform bottles are to be used alternately as occasion seems to require.

The collector will soon find that while many of the moths will bear a brilliant light, many others will start as soon as light enough is thrown upon them to make them fairly visible. He must therefore be exceedingly wary of starting these timid ones, even though his present quest be among those which bear the greater amount of light, for oftentimes the fluttering of two or three will start from the tree nearly every individual, and hundreds will be in the air on the shortest notice. I have never succeeded with ale, stale beer or rum, in so intoxicating any species of Catocala that it would bear light or noise without indicating dissatisfaction. This leads me to remark that one will invariably meet with the best success when he works alone. Conversation will surely start the moths from any enticements of sugar that can be devised. I have even been much annoyed by a cat which would persistently precede me from tree to tree, and in her anxiety to get food (for she devoured the moths greedily), would thus startle the very ones which I was particularly anxious to capture. On one occasion a chipmunk visited one of my trees and kept it completely cleared of the bait with which I had supplied it, becoming at

length so indifferent to other surroundings that I had little difficulty in giving him a sound rap over the head with a hickory switch, which sent him some ten feet away, and though he scrambled hastily up a neighboring tree, I found him on my next round, a few minutes afterward, demurely licking my sugar again as though nothing had happened.

Notwithstanding the season just closed has been somewhat noticeable for the scarcity of Lepidoptera, a fact doubtless to a great extent due to the severity of the previous winter, the subjoined table will show that the material collectible at sugar is at least reasonably abundant. It will be seen that for the four weeks beginning on Aug. 17th, I was at my post five nights each week. Subsequent to that period other duties prevented my continuing the work regularly. It should be observed also that whereas I made a somewhat exhaustive examination of the trees from Aug. 17th to Sept. 11th inclusive, I after that time made no memorandum of the more common species which still continued to throng for their accustomed food. In connection with a few of the species enumerated no dates are designated, as my memoranda failed to indicate the precise time of their capture. Earlier in the season (June) I had taken at sugar *Thyreus Abbottii*, *Anisopteryx vernata*, *Catocala fratercula*, *C. ilia*, etc., etc., which, except the last named, did not occur after Sept. 17th. Where but a single date of capture appears, usually but a single specimen was taken. Of *Pachypolia atricornis*, however, several fresh specimens were taken Oct. 6th, and one or two on a subsequent date, indicating for this species a very late apparition. Of *Scoliopteryx libatrix*, also, several specimens were taken, and, though not taken, it was observed a night or two previous to Sept. 10th.

Agrotis Normaniana Gr., August 18, 24, 26, 27, 28, 31 ; September 2, 3, 4, 7, 8, 9, 10, 11.

" baja S. V., August 18, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" badinodis Gr., September 10, 15.

" c-nigrum Linn., August 17, 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" bicarnea Guen., August 18, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" herilis Gr., August 24, 25, 26, 27, 28, 31 ; September 1.

" tricosa Lintn., August 24, 25, 26, 27, 28, 31.

" subgothica Haw., August 18, 19, 20, 21, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

Agrotis tessellata Harr., August 18, 26, 27, 28, 31 ; September 1, 3, 4.
" clandestina Harr.
" alternata Gr., September 23.
" cupida Gr., September 15.
" saucia Hübn., August 17, 18, 24, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11.
" velleripennis Gr., August 28.
" messoria Harr., August 17, 18, 19, 21, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11, 23.
" suffusa S. V., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Eurois occulta Hübn., August 27.
" herbida W. V., August 25.
Mamestra subjuncta G. & R., August 17 ; September 10.
" laudabilis Guen., September 8.
Dianthoecia meditata Gr., August 18, 19, 20, 21.
Pachypolia atricornis Gr., October 6.
Hadena arctica Bois., August 17, 18, 19, 20, 24, 25, 26, 27, 28 ; September 11.
" devastator Brace., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" adjuncta Bois., August 28.
" sputator Gr., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 4, 7, 8, 9, 10, 11.
" modica Guen., August 24.
" renigera Steph., August 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Perigea xanthioides Guen.
Dipterygia pinastri Linn., August 17, 18, 19, 26, 27, 28, 31; September 1.
Hyppa xylinoides Guen., August 17, 18, 26, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Prodenia commelinae Abb. & Sm., August 17, 19, 25, 28; September 1.
Helotropha reniformis Gr., August 18, 19, 21, 25; September 3, 4, 8, 22.
" atra Gr., September 10.
Hydroecia nictitans Linn., August 17, 26, 27.
" sera Gr. & R., August 18.
Gortyna immanis Guen., August 26; September 3, 4, 10, 11, 22, 23.
" rutila Guen., September 2, 3.
" nebris Guen., September 15.

Platysenta atriciliata Gr., August 18.
Heliophila pallens Linn., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 4, 7, 8, 9, 10, 11.
" phragmitidicola Guen., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" Harveyi, Gr.
" renipuncta Haw., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" pseudargyria Guen.
Laphygma frugiperda Abb. & Sm., September 2.
Pyrophila pyramidoides Guen., August 17, 18, 19, 20, 24, 25.
Taeniocampa oviduca Guen.
Atethmia pampina Guen., September 23.
Orthosia inulta Gr., September 22, 23; October 2.
Xanthia ferruginoides Guen., September 3, 4, 10, 15, 22, 23, 29.
Scoliopteryx libatrix Linn., September 10.
Lithophane cinerea Riley, August 18, 26.
Calocampa nupera Lintn., September 23.
Crambodes talidiformis Guen.
Plusiodonta compressipalpis Guen., September 4.
Telesilla cinereola Guen., August 26, 27; September 1, 2, 3.
Lygranthoecia brevis Gr., September 10.
Pyrrhia exprimens Walk., August 28.
Eustrotia carneola Guen., August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4.
" nigritula Guen.
Drasteria erichtea Cram., August 17, 18, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" erichto Guen., September 11.
Catocala insolabilis Guen., September 2.
" unijuga Walk., September 7, 11, 15.
" Briseis Ed., September 11.
" parta Guen., September 2, 23; October 2, 3.
" concumbens Walk., August 17, 24, 25, 26, 27, 28, 31; September 1, 8, 10, 11, 23.
" amatrix, Hübn., August 31; September 1, 7, 11, 22, 23; October 2, 3.
" cara Gnen., August 17, 18, 31; September 2, 3, 7, 8, 9, 11, 15, 22, 23, 29; October 2, 3.

Catocala ilia Cram., August 19; September 23.
" cerogama Guen., August 31.
" neogama Guen., August 31.
" piatrix Gr.
" habilis Gr., October 23.
" consors, Abb. & Sm., September 7.
Homoptera lunata Drury, August 18, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
" Saundersii Beth., September 1, 2, 3, 4, 7, 8, 9, 10.
" edusa Drury, September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
Pseudaglossa lubricalis Geyer, August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10.
Epizeuxis americalis Guen., September 10.
Zanclognatha cruralis Guen., August 28.
Orthosia helva Gr., August 18, 21, 28; September 3, 4.
Homopyralis tactus Gr., August 28.
Camptogramma gemmata Hübn., September 2, 3.
Phaecariophora niveiguttata Gr.
Ochyria latirupta Walk., October 2.
Eupethecia miserulata Gr., September 23.
Asopia costalis, September 3.
Tortrix coruscana Clem., September 3.
Darapsa choerilus Walk., August 26.

ON CHOEPHORA AND ALLIED GENERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The discovery of fresh specimens has induced me to modify my proposed fusion of the genera *Choephora* and *Pseudorthosia* (Bull. B. S. N. S., 3, p. 86). For the present I would arrange the species as follows:

♂ Antennæ bipectinate, setose; eyes naked; all the tibiæ spinose: abdomen cylindrical. . . Choephora *G. & R.* (Sp. 2: C. fungorum *G. & R.*, C. pectinata *Grote.*)

♂ Antennæ brush-like; eyes naked, lashed; all the tibiæ spinose: abdomen cylindrical; habitus of *Orthosia*. . . Pseudorthosia *Grote* (Sp. 1: P. variabilis *Grote*).

Fore tarsi with prominent spines at the extremity of the joints; fore tibiæ not spinose, middle and hind tibiæ spinose; abdomen a little flattened: habitus of *Glaea*. . . Pseudoglaea *n. g.* (Sp. 2: P. blanda *Grote*, P. taedata *n. s.*).

Pseudoglaea taedata n. s.

♀. The males are not known of this genus, which differs from the *Ammoconia* group of *Agrotis*, by the want of a mesial thoracic crest, unarmed fore-tibiæ and the spines on the fore tarsi. *P. taedata* is of a faded olive fuscous, with a dusting of darker scales; hind wings and under surface tinged with ruddy. Stigmata darker than the wing, blackish; orbicular rounded; reniform upright, squarish. T. p. line black, even, nearly straight, slightly bent; s. t. line irregular. Hind wings with faint mesial line and spot, more visible beneath, where in the primaries the discal mark forms an annulus. *Expanse* 44 m. m. Texas (G. W. Belfrage, No. 584, Nov. 15).

In the specimen the t. a. line is not indicated. The large species would be taken for a *Glaea* at first sight. It is paler, more dusty colored than *P. blanda*, with larger stigmata. There is a faint terminal festooned line on the wings, beyond which the concolorous fringes are paler, a little yellowish, at their base.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

GRACILARIA.

G. negundella. N. sp.

Basal joints of fore legs ochreous red; femora and tibia dark brown, obscurely marked with white; tarsi white dusted and annulate with brown. Intermediate legs like the first pair, except that the basal joints are brown; hind legs and the under surface of the abdomen white dusted with dark brown, the tarsi tinged with yellowish and the upper surface of

the abdomen brownish. Palpi dark brown, with whitish scales intermixed on the under surface; antennae with alternate annulations of white and dark brown; head, thorax and fore wings ochreous, dusted with white and with some small dark brown spots along the costal and dorsal margins (these spots are sometimes indistinct), and the apex sometimes sparsely dusted with dark brown scales; the triangle is *very faintly* indicated, being a little paler than the rest of the wing; ciliae pale grayish fuscous, with the apex and a "hinder marginal" line about the middle dark brown. *Al. ex.* 7 lines. The larvae were found in abundance at Drura, Colorado, in September (alt. 5,300 ft.) rolling downward from the tip of the leaves of the Box Alder (*Negundo*). Though this tree is abundant in Kentucky, I have never met with any larvae of this genus feeding on it.

In the last number of the *Cincinnatti Quarterly Journal of Science* (Vol. 2, p. 289) I have published descriptions of other species of *Tinea* from Colorado, but that paper abounds in typographical errors, some of which it is necessary to correct to prevent confusion; and as that journal is no longer published, I avail myself of this opportunity to correct them. Such mistakes as "*Tenaina*" instead of *Tinea* are palpable and scarcely need correction, but there are others that do. P. 290, for "*rosasuffusella*" read *roseosuffusella*; for "*Taygate*" read *Taygete*. P. 291, for "*gallaesetidaginis*" read *gallaesolidaginis*. P. 292, for "*cruciferum*" read *cruciferarum*. P. 294, for "*gædastella*" read *gedartella*, and for "*sparsipulvella*" read *sparsipulvella*. P. 295 and elsewhere, for "*Phyliatis*" read *Phyllocnistis*. P. 300, for "*lespedegefoliella*" read *lespedezefoliella*. P. 301, for "*puinrosella*" read *prunionella*, and p. 304, for "*Thuiva*" read *Theisoa*.

I take this opportunity also to correct a few errors of a similar character which, thanks to the P. D. or bad chirography, have crept into some recent numbers of the CAN. ENT. Ante p. 124, for "*bodicella*" read *badiiella*. The position in which the names *Solenobia Walshella* Clem. and *Tinea auropulvella* Chamb. are placed on p. 125, *might* possibly convey the impression that they are considered as synonyms for the same species, but such was not my intention, as the insects are very distinct and have but little resemblance to each other. *Walshella* is *loc. cit.* only catalogued as found in Canada.

NOTES ON ARCTIA AMERICANA.

BY H. H. LYMAN, MONTREAL, P. Q.

As I have reared the above named moth from the egg, I can add an interesting fact or two to the account of its preparatory stages, published by Mr. Bunker on p. 149, vol. vii, of this periodical.

From a batch of eggs laid about August 6th, I obtained a number of larvæ, eight or ten of which passed through their last moult but one on September 23rd, and one accomplished its last moult on October 5th, after which it rapidly increased in size, attaining its full growth in a day or two, and then spun itself up into a cocoon, which was kept in the house. The imago emerged on November 28th. All the others died during hybernation.

CORRESPONDENCE.

I am able to add the names of two more species of butterflies to Mr. Caulfield's "List of Diurnal Lepidoptera of the Island of Montreal," published on pages 86–90, of vol. vii, namely: *Lycæna violacea* Edw., very rare; I took one ♀ specimen on our mountain, on June 10th, 1874. *Amblyscirtes vialis* Edw., very rare; one example taken on our mountain on June 8th, 1875. I am indebted to Mr. Scudder for the determination of these species. There is one error in Mr. Caulfield's List which requires correction; the name *Euphyes metacomet* Harris should be substituted for *Hedone orono* Scudder, as the latter does not occur here as far as known.

H. H. Lyman, Montreal, P. Q.

Weevil Cocoons.—W. H. G. writes in *Science Gossip*, No. 133, Jan'y 1, 1876, that he obtained the Weevil *(Cionus scrophulariæ)* from cocoons made by the larvæ on the Water Betony *(Scrophularia aquatica)*.

Wm. Couper, Montreal, P. Q.

Vanessa Milberti.—This insect has lately come from its winter retirement in some numbers. The weather has been delightful.

W. L. Mead, Ithaca, N. Y.

The Canadian Entomologist.

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ANNUAL ADDRESS

OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1875.

To the Members of the Entomological Society of Ontario:—

GENTLEMEN,—For the fifth year in succession I find myself called upon, as your President, to address a few words to you on the condition of our Society, and on the subject of Entomology in general.

With regard to the Society, you have already learnt from the satisfactory Reports of the parent organization and its various Branches, that it continues to go on prospering in a quiet, unostentatious way. While there has been no marked increase to our list of members during the past year, and no performance of any work of unusual importance, yet it is a matter of congratulation that we have no falling off either in numbers or resources to deplore. Much of the inactivity in Entomological matters that has been apparent in this country during the past year may no doubt be ascribed to the prevalent "hardness of the times," which has occasioned—even to those least affected by it—much anxiety of mind, conjoined very often with increased absorption in the cares of business or in the labours necessary for obtaining a livelihood. As you are well aware, we have in Canada but very few persons of assured wealth, who are able, as in older and richer countries, to devote their abundant leisure to literature, art or science. Consequently the condition of things in the world about us deprives most of our members of the leisure, if not also of the inclination, requisite for the successful pursuit of Entomology in any of its various phases. Before another winter opens upon us, however, we have reason to believe that the worst of the present financial storm will be over, and that renewed confidence and prosperity throughout the country will remove the gloom and dulness now oppressing almost every department of work among us. With a revival of business, we may assuredly look for a restoration of activity in scientific pursuits, and hope that our Society, in common with others of a kindred character, may be distinguished by large accessions to its numbers, and by increased work in all its departments.

Last year, at our annual meeting, I took the opportunity of calling your attention to many fields of Entomological labour that are now all but unexplored in this country. May I repeat that there is ample scope for the exertions of all our members, whether they care only to form collections of specimens, or prefer to devote their labours to the unfolding of the life-histories or the study of the classification of insects? There is plenty of work remaining to be done even in the favourite orders of Lepidoptera and Coleoptera, to say nothing of the others that are not so generally studied or collected. It would be a valuable contribution to our store of knowledge were lists of the Canadian species of all orders of insects to be formed, and presented to the Society for publication; and at the same time a revision made of those published some years ago.

But not only is there scientific work of this kind to be performed, which will require generations for its complete achievement; there comes before us at the present moment an extraordinary object for accomplishment during the approaching winter—I allude to the representation of the Society by means of a collection of Canadian insects at the approaching Centennial Exhibition at Philadelphia. You will all, I think, agree with us in the belief that it is a matter of great importance to the Society that it should be brought in this way before the notice of the world, and that it cannot but be of some benefit to the Dominion that its Natural History, as well as its industrial resources, should be fully exhibited. The Council of the Agricultural and Arts Association have already, on our behalf, brought the matter before the Commissioners appointed by the Government, and we understand that a sum of money will be provided to aid us in the satisfactory performance of the work. To gather together a fitting collection of insects, and to prepare them for exhibition, is a task that will strain to the utmost all the resources of the Society. We have commenced the work relying upon the co-operation of you all, and now we trust that every one will help us by the loan of specimens and any other aid that can be afforded. The Society is committed to the task; let us see to it that there be no failure!

Before turning from matters immediately affecting our Society, I may mention that our periodical, THE CANADIAN ENTOMOLOGIST, continues to be maintained with undiminished efficiency and interest, being largely supported and contributed to by our Entomological brethren of the United States; and that the last ANNUAL REPORT presented by the Society to the Legislature has been received with more than usual marks of favour by the press, scientific, agricultural and political, not only in

Canada and the neighbouring States, but also in England: we have been naturally gratified to observe that in many instances copious extracts have been made from its pages, and even a whole article reprinted in an English scientific magazine.

Having referred thus far to our Society and the things that especially concern it, let me now say a few words regarding Entomological matters in general. At the Annual Meeting of the American Association for the Advancement of Science, held in August last, at Detroit, Michigan, the general Entomological Club, organized last year at Hartford, met for the first time. Its sessions, held daily throughout the week of meeting, were remarkably interesting. They were presided over by Dr. LeConte, undoubtedly the greatest of living American Entomologists, and were attended by a great majority of the noted Entomologists of this continent. Our own Society was most efficiently represented by our able Editor, Mr. Saunders: I much regret that the pressure of business matters at home prevented me from accompanying him, as I fully intended to have done. As a complete report of the proceedings is being published in the CANADIAN ENTOMOLOGIST, I need not detain you by any account of them here. Next year the meeting is to be held at Buffalo, N. Y.—a place even more convenient of access for Canadians than Detroit. We trust that a large number of our members will avail themselves of this opportunity—which may not occur again for many years to come—of attending the sessions, and making the personal acquaintance of our American brethren. From past experience I can assure them of a hearty welcome, while no one can doubt that more valuable information can be acquired in a few days in an assemblage of this kind than can be obtained in years of solitary work.

During the season that is now all but brought to a close, there has occurred nothing of a very startling or unexpected character. The Colorado Beetle has continued to extend his ravages throughout our country, but he has been met by such a determined and universal resistance that his work of devastation has been hardly appreciable: certainly in the central portion of this Province we have never had a finer crop of potatoes both as regards quantity and quality. The Cabbage Butterfly (*Pieris rapæ*), to which I also referred last year, has been rapidly extending to the west, and has already become a common object in the neighbourhood of London. So closely, however, does its parasite (*Pteromalus puparum*) follow in its wake, that where a year ago it was most destructive to all its food-plants, it has this season wrought but a

moderate amount of danger. The Locusts, or Grasshoppers, of the West *(Caloptenus spretus)*, have continued to commit much havoc, though not by any means on the frightful scale of last year; there is every prospect that the destitution and suffering then occasioned by them will not be repeated to any very great extent this year.

While there has been upon the whole a decided diminution in the amount of loss occasioned by noxious insects during the past year, we have nevertheless to record an increase in the numbers and consequent power for evil, of several common species that are always more or less abundant; among the most notable I may mention the Army Worm *(Leucania unipuncta)*, which has wrought much damage in the Maritime Provinces of the Dominion, as well as in some portions of the United States; the two species of Tent-Caterpillars *(Clisiocampa Americana* and *sylvatica)*, which have been excessively abundant and destructive to fruit and forest trees in many parts of this Province; and the Pea Weevil *(Bruchus pisi)*, which we much fear may soon become—unless measures are taken to prevent it—a source of great loss to our agriculturists. These I mention as having had a more than usual manifestation this year, but I need not detain you with any account of the ordinary work of our insect friends and foes, which are so familiar to every one in this country.

As I mentioned at the outset, you have done me the great honour of electing me your President for five years in succession; while I thank you most cordially for your kindness and consideration so repeatedly shown to me, I feel that it is only reasonable that I should now make way for some one else, who may be able to devote more time and energy to the interests of our Society, and be of more real use to it than I have latterly been capable of. I beg, therefore, to resign into your hands the office that you have so long honoured me with; at the same time I desire to say that I shall continue always to have the welfare of the Society at heart, and that I shall ever be ready and willing to do all that lies in my power to advance its best interests. Again offering you my respectful thanks,

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE.

Trinity College School, Port Hope, September, 1875.

NEW TEXAN MOTHS.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Parasa incisa, n. s.

♂. This species has the fore wings and thorax of a soft brown. The primary is covered by a pea-green patch, which does not reach the margins and is defined outwardly by a narrow dark line running once deeply inwardly below vein 2 and slightly opposite the cell. Hind wings light yellowish. It appears to be allied to *paenulata* Clem., unknown to me, but differs by the shape of the green patch and in its not being bordered with white. The thorax in *P. chloris* is grass green. Expanse 21 m. m. Bosque Co., Texas (Belfrage, No. 554.)

Euerythra phasma, n. g. et sp.

♂. The insect is allied to *Spilosoma*, but the head is more prominent, the wings narrower and the antennæ more continuously pectinate. The neuration has not been studied of this form, which is so distinctly marked as to be at once recognized, and which I do not find in authors. White. Fore wings white, crossed by a broad irregular blackish band from base to extremity of veins 3 and 4, where it retains the otherwise white fringes. From apices to middle of external margin a second band diagonally crosses the wing. A discal black spot and traces of an extra basal band. Everywhere, where the blackish color obtains the veins are bright yellow, as is the submedian fold. Body above crimson whitish at base. Thorax and head above white. Squamation about the eyes crimson. Anterior legs fuscous outwardly: palpi fuscous. Beneath, the white secondaries show a dot. Expanse 38 m. m. (May 5, Belfrage, No. 471).

Litodonta, n. g.

Allied to *Heterocampa* of Doubleday. It differs by the antennæ being pectinate in both sexes. The thorax is more brushily tufted behind; the head more appressed; the abdomen shorter.

Litodonta hydromeli, n. s.

♂ ♀. Fuscous, overspread with pale green on primaries and thorax. Basal and sub-basal spaces powdered with orange scales: subterminal line followed by orange scales. Lines distinct, widely geminate, sinuate,

sub-lunulate: space beyond the black discal streak clear fuscous. Fringes pale cut with fuscous, opposite the ends of nervules; terminal line distinct. Hind wings pale at base, smoky outwardly; beneath fuscous, with distinct terminal lines and fringes cut with fuscous. Thorax lined with black on tegulæ and collar. Expanse 34 m. m. May 7, Belfrage, No. 246.

I describe the type of this genus, the only one of the species which has the orange shadings. A paper is being prepared with a plate of the species, which are difficult to separate without illustration.

Aletia hostia, *n. s.*

Smaller than *argillacea*. It differs by the stigmata being expressed by white dots, of which two super-posed, express the reniform. The ordinary lines are very narrowly white margined, appearing guttate. Hind wings blackish; fore wings darker than in *argillacea*. The t. p. line is at first sight more distinct than in its common ally. Easily recognized by the above characters. Belfrage, No. 535.

Caradrina conviva, *n. s.*

A small species of the size of *grata* (*rasilis* Morr.) Palpi black at the sides. Pale yellow brown, or fawn color. Lines dotted. T. p. line widely geminate. Subterminal line a blackish shade. Fringes blackish T. a. line incomplete, strongly dentate. Reniform ill defined; a blackish shade above it on costa indicates the median shade; a dot indicates the orbicular. Terminal line black, interrupted. Hind wings white, glistening, immaculate, beneath stained along costal region and above here a little tinted. Thorax and head above like fore wings, abdomen pale. Expanse 21 m. m. Belfrage, No. 539.

Mamestra brachiolum, *n. s.*

♂ ♀. Very near the Californian *M. cuneata* Grote, differing as follows: There are no yellow shades beyond the subterminal line, which is more distinctly waved in the female: the claviform is present, absent in its ally; the thorax is purely fuscous and the whole insect darker than in the Californian species; in the male at least the orbicular is more rounded, the t. p. line is straighter, not inwardly bent below the median vein, hence the lines are inferiorly wider apart than in *cuneata*. Else the two species are very similar. *Expanse* 28 m. m. Belfrage, No. 102. In this species the ovipositor is concealed as in *cuneata*.

Catocala Belfragiana Harvey. Bull. B. S. N. S., 2, 281.

I learn that this species is the same as *C. jocasta* of Mr. Strecker. My paper was read Feb. 5th, and printed in February. I do not think as early a date can be shown for the Number of Mr. Strecker. This species extends to Kansas (Prof. Snow); I have vainly tried to identify it with the unknown *messalina* of Gueneé.

NOTES ON BISTON URSARIA Walker.

BY G. J. BOWLES, MONTREAL, P. Q.

This moth, which is very common in and about Montreal, is described by Walker, in a paper by W. S. d'Urban, published in Vol. 5 of the *Canadian Naturalist* (1860), entitled "A Systematic List of Lepidoptera Collected in the Vicinity of Montreal." It is also taken at Quebec, but I met with only two specimens there during several years' collecting.

The following is the description (of one sex only):

"Male. Dark cinereous, speckled with black, very robust and pilose. Antennae very broadly pectinated. Thorax with three black bands. Legs densely tufted. Fore wings with four black oblique lines, first line bent, second and third approximate, slightly undulating, diverging towards the costa, fourth diffuse. Hind wings with first line obsolete, second and third apparent, fourth indicated by a short broad streak near the interior angle. Length of body 8—9 lines; expanse 22—24 lines."

The female is generally larger, less distinctly marked, and the wings are more transparent. Antennae filiform.

The English species (*B. histaria*) stands on our list as a native of Canada, but I have not met with it. The habits of the two species are very similar, and the caterpillars resemble each other closely; indeed, were it not for the difference in color and markings between the perfect insects, they would no doubt be considered identical. The description of the larva of *histaria* given by Newman, in his "Natural History of British Moths," would answer equally well for that of *ursaria*, and its

habits are similar to those of the latter. It sometimes occurs about London in such numbers as to strip the trees of their leaves, and the moths are taken in the squares of that city, sometimes twenty or thirty on one tree.

The Champ de Mars, Montreal, is a favorite breeding place of *ursaria*. The Lombardy Poplars growing in this locality are infested with them year after year. In some seasons the trees are partially defoliated by the larvæ, and during the last week of April and the first of May the moths are to be found in great numbers. This year they were a little later than usual. On the 5th May I first observed them, many having just emerged from the pupa, and resting on the tree trunks with unexpanded wings. On the 6th I brought home two females, and placed them in boxes to obtain the eggs. Two days afterwards each had laid about two hundred eggs of a bright green color, globular, and without markings under a low microscopic power. They were .04 in diameter, and laid (in each case) principally in the narrow opening between the lid and side of the box. The female has an ovipositor which can be extended at least a quarter inch, for the purpose, perhaps, of laying her eggs in the interstices of the bark, as they are deposited some time before the leaves expand. About the nineteenth day the eggs changed color, and became steel blue. On the 29th May they began to hatch out, just as the poplars were expanding their leaves. The larvae were very active, and from the first had the peculiar geometric habit of resting now and then with the body extended full length in the air, supported only by the claspers. I turned them out on a young plum tree, and they soon began to feed freely, and grew rapidly. Strange to say, they quickly diminished in numbers, and but few reached maturity.

New-born larva.—.12 inch long, black, head large, with a few whitish hairs; front edge of first segment bordered with white, second and third with white spiracles; next five segments have two white spots on back, one on each side around spiracles, with another white spot below. Legs black; body beneath black.

Mature larva.—2 to 2.50 inches long, general color drab or dingy purple; head of a lighter shade, and spotted with black. First segment bordered in front with a yellow line, indented behind; fourth to eighth inclusive, each with six very small yellow tubercles, two on back, one behind and one below each spiracle. Body striped from head to tail with twelve reddish lines, each bordered on both sides by an irregular

narrow black line: six of the reddish lines are on the back and sides, one (interrupted) through the spiracles, and four on abdomen. Anal segments spotted with black, as also first, second and third segments. Mouth pinkish, legs pink, spotted with black; spiracles dark colored.

It will be seen that the larva changes but little during growth. At the end of July they descend and bury themselves in the earth, changing in a few days to pupae, without forming any case. The pupa is brown, rather stout in form, and furnished at the tail with a small spine, which is generally bifid. It much resembles that of *Amphidasys cognataria*.

NEW SPECIES OF ACRIDINI FROM NEBRASKA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Pezotettix junius, n. s.

Frontal costa slightly sulcate below the ocellus in the ♂. Merely depressed at the ocellus in ♀.

Median carina of pronotum slight, cut by the last transverse incision behind the middle, the anterior part slightly arcuate. Lateral carinæ distinct only on the flat posterior lobe. Pronotum with sides slightly divergent; obtuse angled behind. Elytra cover about two-thirds of the abdomen. Posterior femora as long as abdomen. Last segment in ♂ squarely produced. ♂ cerci broad, short, rounded at tip, slightly curved on upper edge. The lower edge bends upward, making an obtuse angle about the middle, from which point the cerci rapidly decrease in width.

Color of living insect.—Varies with age from gray to green. Face and sides of thorax greenish gray. A broad black stripe from eye to last transverse incision of pronotum. Occiput brown. Pronotum brown with green stripe on each side. Antennæ red, tips brown. Elytra brown, sometimes yellowish, with a few black dots along the disk. Hind femora light brown, usually with two oblique whitish bands on upper half. Three black spots on upper edge. Tip black. Inner side and lower sulcus light green. Abdomen greenish gray, with a row of large black spots on each side, sometimes forming an almost continuous longi-

tudinal stripe. Abdomen sometimes mottled with black above, is greenish yellow below, with a narrow black line on the last segments below the fold. Sternum and anterior legs tinged with blue. Hind tibiae pale red with black spines. In the male the posterior segments of the abdomen are margined anteriorly with black.

Length of ♀ .90 inch; elytra, .45 inch. Length of ♂ .80; elytra .40. Appears in June at Glencoe, Dodge Co., Nebraska.

Pegotettix autumnalis, n. s.

Frontal costa prominent above, suddenly widened and sulcate at the ocellus. Head unusually large, wider than thorax, occiput very long. Foveola of vertex shallow. Median carina of pronotum slight, cut once behind the middle. Sides of pronotum nearly parallel. Elytra short, oval, pointed. Abdomen rather long and slender, extending beyond the tips of hind femora in ♀. Male cerci nearly straight, broad at base, apical half slender and pointed. Tip of abdomen pointed entire.

Color of dried (not alcoholic) specimens—Face brown, white mottled with brown below clypeus. Cheeks yellow and brown. Antennae rufous. A black stripe from eye to last lobe of pronotum. A yellow spot below the black stripe. Remainder of pronotum brown, hind lobe lightest. Occiput brown margined with yellow. Elytra dark brown, unspotted. Abdomen dark above. Anterior legs yellow, marked with red above. Posterior femora yellow at base, then red on both sides and below, but heavily marked on upper side of exterior face with fuscous. Posterior tibiae blue.

Length of ♀ 1.10 inch; elytra .25 inch. Length of ♂ .85 inch; elytra .203 inch. Glencoe, Nebraska, in September.

Pezotettix alba, n. s.

Form—Frontal costa sulcate, extending across clypeus in living specimens. Foveola of vertex hexagonal, shallow. Median carina of pronotum distinct, cut by last transverse impression back of the middle. Lateral carinæ rounded, nearly parallel. Elytra cross third abdominal segment in ♀. Wings minute. Legs long and slender. Male cerci long and slender. Terminal segment of abdomen entire acuminate. In the male the antennæ are longer than head and pronotum, and the posterior femora pass the abdomen one-fourth of their length.

Color of living insect—♂, vertex, disk of pronotum and legs bright green. Face, abdomen and under side greenish white. Elytra a little

darker. A white stripe from top of eye follows the lateral carinæ to the end of pronotum, and extends obliquely down the side to insertion of posterior femora. Below the white stripe, and running parallel with it, is a broad band of green followed by another white stripe.

Color of ♀ vertex, disk of pronotum and legs white, mottled with green. Rest like ♂, but much whiter. Antennæ light brown.

Length of ♀ .85 inch ; elytra .02 inch. Length of ♂ .65 inch.

Taken in August and September at Glencoe, Dodge Co., Nebraska.

Caloptenus lurida, n. s.

Size and form much like *C. occidentalis* Thos. Frontal costa with slight depression at ocellus, not sulcate. Foveola of vertex shallow, elongate, broadest in ♀. Median carina of pronotum slight, transverse impressions distinct. Lateral carinæ slightly divergent. Antennae longer than head and pronotum. Posterior femora as long as the abdomen. In the male the cerci are broad and flat, considerably curved and armed posteriorly with a rather long and sharp lateral tooth, giving them about the shape of the letter Y. Last ventral segment entire. In color this species, when living, is dark bluish gray. The pronotum and upper part of the head are sometimes lighter and tinged with red. Labrum bright red ; antennae red at base, rest fuscous. Posterior femora light gray, with a longitudinal black stripe the entire length of the disk, and three black spots on the upper edge : the two posterior ones uniting with the black stripe and extending over upon the inner face. Tip black above, red below. Posterior tibiae blood red, with black spines.

In some specimens a light stripe on the side from base of elytra to posterior femora is apparent, but it is usually indistinct. Elytra cinereous darkest at base, with a central row of fuscous spots.

Length of ♂ .85 inch ; of ♀, 1.05 inches.

Habitat, Dodge Co., Nebraska. Time of occurrence, September.

Caloptenus regalis, n. s.

♀. Size medium. Frontal costa prominent ; not sulcate, but depressed at the ocellus. Top of the head raised slightly above the pronotum. Antennae longer than head and thorax. Disk of pronotum gradually ascending toward median carina. Lateral carinae rounded. Pronotum depressed and cut near the middle by the last transverse incision. Hind border obtuse angled.

Color of living insect—Face bluish white, mottled with brown. Cheeks blue, with an oblique darker patch. Eyes prominent, dark brown, hind margins dotted with black lines. Occiput with a triangular black spot, apex forward, bounded on each side by bright yellow. Sides of the thorax margined anteriorly with yellow. A black stripe behind the eye runs backward to the last transverse incision of pronotum. Below this stripe the sides are purplish blue, marked posteriorly with red. Disk of pronotum brown, margined with blue. Elytra gray, darkest at base. Disk white, containing a row of large black spots. Similar but smaller spots unequally distributed over the rest of the elytra. Apex dusky. Wings transparent, with white veins. Posterior femora externally red, with three oblique black bands. Inside and lower sulcus bright red. Upper edge bluish gray, with three broad black patches. Apex gray above, white outside, blue within, and marked with the usual black crescent-shaped patch. Hind tibiae bright blue, with a narrow white annulation near the knee. Tarsi blue above, white below. Anterior legs yellowish, mottled above with blue. Abdomen white, with the anterior part of each segment red, and a small black spot on each side. Beneath bluish white. Antennae light brown.

Length about one inch; length of elytra, .80 inch; length of hind femora, .55 inch. *Habitat* Glencoe, Nebraska. Appears in latter part of June.

SUGARING FOR MOTHS.

BY O. S. WESTCOTT, MAYWOOD, COOK CO., ILL.

The various preparations which have been recommended by different writers seem to be successful enough in attracting nocturnal Lepidoptera, while the poisons employed for quieting them seem to fail in one or more essential particulars. Cyanide of Potassium, whether alone or prepared with Plaster of Paris, does not act with sufficient readiness to prevent strong-bodied moths from fluttering so long as in a great measure to spoil the beauty of their vestiture, while the application of chloroform at night is attended with considerable inconvenience. I have found a plan like the following to work best in practice.

Have not less than four wide-mouthed bottles, two of them of sufficient size to be placed over any Catocala without rubbing him. Have each of these last provided with a large, well-fitting cork, to the bottom of which firmly tack a small piece of sponge. This sponge is to be moderately supplied with chloroform. The other bottles are to be filled for one-fourth of their depth with small fragments of Cyanide of Potassium, thoroughly covered with plaster of Paris in the usual way.

A hunting-coat which is provided with numerous pockets will be found a great convenience, the chloroform bottles occupying the side pockets, and the Cyanide bottles the hip pockets. For the completest success a dark lantern is almost indispensable. This should depend from a strap passed around the waist, so that both hands may be left free for purposes of manipulation. The moths are with no difficulty covered by the chloroform bottle, the effect of the chloroform being almost immediately apparent. Then the moths thus temporarily anaesthetized are transferred to the Cyanide bottles, whose contents complete the work so well begun. The two Cyanide bottles are a great convenience in keeping apart the large and the small specimens, and these being kept constantly in an upright position, the danger of injury from rubbing is reduced nearly to a minimum. The two chloroform bottles are to be used alternately as occasion seems to require.

The collector will soon find that while many of the moths will bear a brilliant light, many others will start as soon as light enough is thrown upon them to make them fairly visible. He must therefore be exceedingly wary of starting these timid ones, even though his present quest be among those which bear the greater amount of light, for oftentimes the fluttering of two or three will start from the tree nearly every individual, and hundreds will be in the air on the shortest notice. I have never succeeded with ale, stale beer or rum, in so intoxicating any species of Catocala that it would bear light or noise without indicating dissatisfaction. This leads me to remark that one will invariably meet with the best success when he works alone. Conversation will surely start the moths from any enticements of sugar that can be devised. I have even been much annoyed by a cat which would persistently precede me from tree to tree, and in her anxiety to get food (for she devoured the moths greedily), would thus startle the very ones which I was particularly anxious to capture. On one occasion a chipmunk visited one of my trees and kept it completely cleared of the bait with which I had supplied it, becoming at

length so indifferent to other surroundings that I had little difficulty in giving him a sound rap over the head with a hickory switch, which sent him some ten feet away, and though he scrambled hastily up a neighboring tree, I found him on my next round, a few minutes afterward, demurely licking my sugar again as though nothing had happened.

Notwithstanding the season just closed has been somewhat noticeable for the scarcity of Lepidoptera, a fact doubtless to a great extent due to the severity of the previous winter, the subjoined table will show that the material collectible at sugar is at least reasonably abundant. It will be seen that for the four weeks beginning on Aug. 17th, I was at my post five nights each week. Subsequent to that period other duties prevented my continuing the work regularly. It should be observed also that whereas I made a somewhat exhaustive examination of the trees from Aug. 17th to Sept. 11th inclusive, I after that time made no memorandum of the more common species which still continued to throng for their accustomed food. In connection with a few of the species enumerated no dates are designated, as my memoranda failed to indicate the precise time of their capture. Earlier in the season (June) I had taken at sugar *Thyreus Abbottii*, *Anisopteryx vernata*, *Catocala fratercula*, *C. ilia*, etc., etc., which, except the last named, did not occur after Sept. 17th. Where but a single date of capture appears, usually but a single specimen was taken. Of *Pachypolia atricornis*, however, several fresh specimens were taken Oct. 6th, and one or two on a subsequent date, indicating for this species a very late apparition. Of *Scoliopteryx libatrix*, also, several specimens were taken, and, though not taken, it was observed a night or two previous to Sept. 10th.

Agrotis Normaniana Gr., August 18, 24, 26, 27, 28, 31 ; September 2, 3, 4, 7, 8, 9, 10, 11.

" baja S. V., August 18, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" badinodis Gr., September 10, 15.

" c-nigrum Linn., August 17, 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" bicarnea Guen., August 18, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" herilis Gr., August 24, 25, 26, 27, 28, 31 ; September 1.

" tricosa Lintn., August 24, 25, 26, 27, 28, 31.

" subgothica Haw., August 18, 19, 20, 21, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

Agrotis tessellata Harr., August 18, 26, 27, 28, 31 ; September 1, 3, 4.
" clandestina Harr.
" alternata Gr., September 23.
" cupida Gr., September 15.
" saucia Hübn., August 17, 18, 24, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11.
" velleripennis Gr., August 28.
" messoria Harr., August 17, 18, 19, 21, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11, 23.
" suffusa S. V., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Eurois occulta Hübn., August 27.
" herbida W. V., August 25.
Mamestra subjuncta G. & R., August 17 ; September 10.
" laudabilis Guen., September 8.
Dianthoecia meditata Gr., August 18, 19, 20, 21.
Pachypolia atricornis Gr., October 6.
Hadena arctica Bois., August 17, 18, 19, 20, 24, 25, 26, 27, 28 ; September 11.
" devastator Brace., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" adjuncta Bois., August 28.
" sputator Gr., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 4, 7, 8, 9, 10, 11.
" modica Guen., August 24.
" renigera Steph., August 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Perigea xanthioides Guen.
Dipterygia pinastri Linn., August 17, 18, 19, 26, 27, 28, 31; September 1.
Hyppa xylinoides Guen., August 17, 18, 26, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Prodenia commelinae Abb. & Sm., August 17, 19, 25, 28; September 1.
Helotropha reniformis Gr., August 18, 19, 21, 25; September 3, 4, 8, 22.
" atra Gr., September 10.
Hydroecia nictitans Linn., August 17, 26, 27.
" sera Gr. & R., August 18.
Gortyna immanis Guen., August 26; September 3, 4, 10, 11, 22, 23.
" rutila Guen., September 2, 3.
" nebris Guen., September 15.

Platysenta atriciliata Gr., August 18.
Heliophila pallens Linn., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 4, 7, 8, 9, 10, 11.
" phragmitidicola Guen., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" Harveyi, Gr.
" renipuncta Haw., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" pseudargyria Guen.
Laphygma frugiperda Abb. & Sm., September 2.
Pyrophila pyramidoides Guen., August 17, 18, 19, 20, 24, 25.
Taeniocampa oviduca Guen.
Atethmia pampina Guen., September 23.
Orthosia inulta Gr., September 22, 23; October 2.
Xanthia ferruginoides Guen., September 3, 4, 10, 15, 22, 23, 29.
Scoliopteryx libatrix Linn., September 10.
Lithophane cinerea Riley, August 18, 26.
Calocampa nupera Lintn., September 23.
Crambodes talidiformis Guen.
Plusiodonta compressipalpis Guen., September 4.
Telesilla cinereola Guen., August 26, 27; September 1, 2, 3.
Lygranthoecia brevis Gr., September 10.
Pyrrhia exprimens Walk., August 28.
Eustrotia carneola Guen., August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4.
" nigritula Guen.
Drasteria erichtea Cram., August 17, 18, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" erichto Guen., September 11.
Catocala insolabilis Guen., September 2.
" unijuga Walk., September 7, 11, 15.
" Briseis Ed., September 11.
" parta Guen., September 2, 23; October 2, 3.
" concumbens Walk., August 17, 24, 25, 26, 27, 28, 31; September 1, 8, 10, 11, 23.
" amatrix, Hübn., August 31; September 1, 7, 11, 22, 23; October 2, 3.
" cara Gnen., August 17, 18, 31; September 2, 3, 7, 8, 9, 11, 15, 22, 23, 29; October 2, 3.

Catocala ilia Cram., August 19; September 23.
" cerogama Guen., August 31.
" neogama Guen., August 31.
" piatrix Gr.
" habilis Gr., October 23.
" consors, Abb. & Sm., September 7.
Homoptera lunata Drury, August 18, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
" Saundersii Beth., September 1, 2, 3, 4, 7, 8, 9, 10.
" edusa Drury, September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
Pseudaglossa lubricalis Geyer, August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10.
Epizeuxis americalis Guen., September 10.
Zanclognatha cruralis Guen., August 28.
Orthosia helva Gr., August 18, 21, 28; September 3, 4.
Homopyralis tactus Gr., August 28.
Camptogramma gemmata Hübn., September 2, 3.
Phaecariophora niveiguttata Gr.
Ochyria latirupta Walk., October 2.
Eupethecia miserulata Gr., September 23.
Asopia costalis, September 3.
Tortrix coruscana Clem., September 3.
Darapsa choerilus Walk., August 26.

ON CHOEPHORA AND ALLIED GENERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The discovery of fresh specimens has induced me to modify my proposed fusion of the genera *Choephora* and *Pseuderthosia* (Bull. B. S. N. S., 3, p. 86). For the present I would arrange the species as follows:

♂ Antennæ bipectinate, setose; eyes naked; all the tibiæ spinose: abdomen cylindrical. . . Choephora *G. & R.* (Sp. 2: C. fungorum *G. & R.*, C. pectinata *Grote.*)

♂ Antennæ brush-like; eyes naked, lashed; all the tibiæ spinose: abdomen cylindrical; habitus of *Orthosia*. . . Pseudorthosia *Grote* (Sp. 1: P. variabilis *Grote*).

Fore tarsi with prominent spines at the extremity of the joints; fore tibiæ not spinose, middle and hind tibiæ spinose; abdomen a little flattened: habitus of *Glaea*. . . Pseudoglaea *n. g.* (Sp. 2: P. blanda *Grote*, P. taedata *n. s*).

Pseudoglaea taedata n. s.

♀. The males are not known of this genus, which differs from the *Ammoconia* group of *Agrotis*, by the want of a mesial thoracic crest, unarmed fore tibiæ and the spines on the fore tarsi. *P. taedata* is of a faded olive fuscous, with a dusting of darker scales; hind wings and under surface tinged with ruddy. Stigmata darker than the wing, blackish; orbicular rounded; reniform upright, squarish. T. p. line black, even, nearly straight, slightly bent; s. t. line irregular. Hind wings with faint mesial line and spot, more visible beneath, where in the primaries the discal mark forms an annulus. *Expanse* 44 m. m. Texas (G. W. Belfrage, No. 584, Nov. 15).

In the specimen the t. a. line is not indicated. The large species would be taken for a *Glaea* at first sight. It is paler, more dusty colored than *P. blanda*, with larger stigmata. There is a faint terminal festooned line on the wings, beyond which the concolorous fringes are paler, a little yellowish, at their base.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

GRACILARIA.

G. negundella. N. sp.

Basal joints of fore legs ochreous red; femora and tibia dark brown, obscurely marked with white; tarsi white dusted and annulate with brown. Intermediate legs like the first pair, except that the basal joints are brown; hind legs and the under surface of the abdomen white dusted with dark brown, the tarsi tinged with yellowish and the upper surface of

the abdomen brownish. Palpi dark brown, with whitish scales intermixed on the under surface; antennae with alternate annulations of white and dark brown; head, thorax and fore wings ochreous, dusted with white and with some small dark brown spots along the costal and dorsal margins (these spots are sometimes indistinct), and the apex sometimes sparsely dusted with dark brown scales; the triangle is *very faintly* indicated, being a little paler than the rest of the wing; ciliae pale gravish fuscous, with the apex and a "hinder marginal" line about the middle dark brown. *Al. ex.* 7 lines. The larvae were found in abundance at Drura, Colorado, in September (alt. 5,300 ft.) rolling downward from the tip of the leaves of the Box Alder (*Negundo*). Though this tree is abundant in Kentucky, I have never met with any larvae of this genus feeding on it.

In the last number of the *Cincinnatti Quarterly Journal of Science* (Vol. 2, p. 289) I have published descriptions of other species of *Tineina* from Colorado, but that paper abounds in typographical errors, some of which it is necessary to correct to prevent confusion; and as that journal is no longer published, I avail myself of this opportunity to correct them. Such mistakes as "*Teneina*" instead of *Tineina* are palpable and scarcely need correction, but there are others that do. P. 290, for "*rosasuffusella*" read *roseosuffusella*; for "*Taygate*" read *Taygete*. P. 291, for "*gallaesotidaginis*" read *gallaesolidaginis*. P. 292, for "*cruciferum*" read *cruciferarum*. P. 294, for "*gædastella*" read *gædartella*, and for "*sparsipulrella*" read *sparsipulvella*. P. 295 and elsewhere, for "*Phyllætis*" read *Phyllocnistis*. P. 300, for "*lespedegofoliella*" read *lespedezæfoliella*. P. 301, for "*puinrosella*" read *prunionella*, and p. 304, for "*Thuiva*" read *Theisoa*.

I take this opportunity also to correct a few errors of a similar character which, thanks to the P. D. or bad chirography, have crept into some recent numbers of the CAN. ENT. Ante p. 124, for "*bodicella*" read *badiiella*. The position in which the names *Solenobia Walshella* Clem. and *Tinea auropulvella* Chamb. are placed on p. 125, *might* possibly convey the impression that they are considered as synonyms for the same species, but such was not my intention, as the insects are very distinct and have but little resemblance to each other. *Walshella* is *loc. cit.* only catalogued as found in Canada.

NOTES ON ARCTIA AMERICANA.

BY H. H. LYMAN, MONTREAL, P. Q.

As I have reared the above named moth from the egg, I can add an interesting fact or two to the account of its preparatory stages, published by Mr. Bunker on p. 149, vol. vii, of this periodical.

From a batch of eggs laid about August 6th, I obtained a number of larvæ, eight or ten of which passed through their last moult but one on September 23rd, and one accomplished its last moult on October 5th, after which it rapidly increased in size, attaining its full growth in a day or two, and then spun itself up into a cocoon, which was kept in the house. The imago emerged on November 28th. All the others died during hybernation.

CORRESPONDENCE.

I am able to add the names of two more species of butterflies to Mr. Caulfield's "List of Diurnal Lepidoptera of the Island of Montreal," published on pages 86–90, of vol. vii, namely: *Lycæna violacea* Edw., very rare; I took one ♀ specimen on our mountain, on June 10th, 1874. *Amblyscirtes vialis* Edw., very rare; one example taken on our mountain on June 8th, 1875. I am indebted to Mr. Scudder for the determination of these species. There is one error in Mr. Caulfield's List which requires correction; the name *Euphyes metacomet* Harris should be substituted for *Hedone orono* Scudder, as the latter does not occur here as far as known.

H. H. Lyman, Montreal, P. Q.

Weevil Cocoons.—W. H. G. writes in *Science Gossip*, No. 133, Jan'y 1, 1876, that he obtained the Weevil *(Cionus scrophulariæ)* from cocoons made by the larvæ on the Water Betony *(Scrophularia aquatica)*.

Wm. Couper, Montreal, P. Q.

Vanessa Milberti.—This insect has lately come from its winter retirement in some numbers. The weather has been delightful.

W. L. Mead, Ithaca, N. Y.

The Canadian Entomologist.

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THE NORTH AMERICAN BLUE BUTTERFLIES OF THE GENUS NOMIADES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Some years ago I proposed* the generic name Glaucopsyche for a group of blue butterflies of eastern N. America having a glaucous sheen to the upper surface of their wings; I had not then recognized its strictly generic alliance with a group of similar forms in Europe and on our Pacific slope, which do not all possess this peculiarity, and to which the older generic name Nomiades Hübn. must be applied. A recent study of their common structural features, however, shows that Glaucopsyche can no longer be retained. Finding that there has been some confusion, at least in the cabinet designations of the species of this group, a brief revision of the same, with comparative descriptions, is here offered

The species belonging to this group, it may be remarked, all have but a single transverse series of spots upon the under surface of the hind wings (the extra-mesial row), the submarginal markings being wholly obsolete. In the six American species the upper surface of the wings of the male are always blue, more or less broadly and distinctly margined with dark brown, while the wings of the female have this surface dark brown, more or less amply suffused from the base outward with blue.

1. N. Xerces (*Lycæna Xerces* Boisd.) In this species the blue on the upper surface of the wings of the male is of a pale tender violet and the margin is neither so black nor so narrow as in the other species, and has a very faint extreme edge of black. The upper surface of the wings of the female is of a little paler brown than in the other species, has a decidedly white, untarnished fringe, and at the base scattered blue scales as in *N. Antiacis*, but extending further from the base: the black outer edge is more distinct than in the female of the other species. Beneath,

* Syst. Rev. Am. Butt., 33.

the species is readily distinguished by its having all the spots large and white, with no black pupils; they are usually roundish subquadrate and those of the same series nearly coalesce to form a continuous band. California.

2. N. ANTIACIS (*Lycæna Antiacis* Boisd., *Lycæna Mertila* Edw.) The blue of the upper surface of the wings in the male of this species is much less pruinose than in the following two species, although it occasionally varies toward them in this respect; the normal color, however, is a deep violet and the black border of the wings is of the same depth of color and narrowness of extent as in these species. The upper surface of the female is almost entirely brown with a few scattered blue scales near the base of the wing running out toward the middle. Beneath, the wings closely resemble those of *N. Couperi*, but the sprinkling of hoary scales is nearly uniform over both wings. California.

Lyc. Mertila Edw. seems to me clearly referable to this species, since the only part of the description which does not fit it is the statement that, on the underside of the fore wings, "from the arc" (or transverse bar at the apex of the cell) "a whitish ray runs toward the base."

3. N. COUPERI (*Glaucopsyche Couperi* Grote; *Lycæna Pembina* Edw. [Syn., nec. Proc. Phil. Acad.]* *Lycæna Lygdamus* Doubl. [List Brit. Mus. nec Entom.]) This species closely resembles the following, with which it has often been confounded; the two, indeed, would perhaps be universally considered geographical races of a single species, were they known to meet anywhere on common ground. The upper surfaces of the wings of the males of the two species appear to agree altogether. The upper surface of the wings of the female of this species is brown, rather heavily suffused with cœrulean blue on the fore wings as far forward as the upper limits of the cell, and to an equal distance toward the outer border; on the hind wings, the blue scales are more generally diffused, but in much less abundance. Beneath, the spots are much smaller than in *N. Lygdamus*, sometimes reduced on the hind wing to the merest black specks encircled with white; and the ground color is obscured, especially on the hind wing, by a rather abundant powdering of grayish hoary scales. A

* A prolonged study of all the species of N. American blues leads me to the conclusion that the true *Lyc. Pembina* Edw. has been twice redescribed; under the names *L. Lycea* Edw. and *L. Rapahoe* Reak.

northern Atlantic species, not yet found in the United States, but extending from Anticosti and Southern Labrador to Lake Winnipeg and the Saskatchewan.

4. N. Lygdamus (*Polyommatus Lygdamus* Doubl. Entom.) I have never seen the female of this species, but the wings of the male are pale glistening pruinose blue above, with a narrow, distinct, black border; beneath, the species is peculiar for the large size of the ocellated spots, the clearness of the dark slate brown ground color little obscured by any dusting. It is a Southern Atlantic species, ranging through the sea board States of the Union from the valley of the upper Susquehanna to Georgia.

5. N. Oro, nov. sp. This species has been referred in collections to the preceding species, with which it is no doubt closely allied, but from which it differs in several particulars. The upper surface of the wings of the male is almost entirely destitute of the pruinose bloom of *N. Lygdamus* and is of a much more delicate, tenderer blue, which permits all the spots of the under surface to be seen upon the upper side, a peculiarity shared with it by the following species only; the dark border of the wings is also narrower than in *N. Lygdamus*, but equally well defined though not so dark; the grayish white fringe of the hind wings is not in the least interrupted by blackish at the nervure tips, as it always is in *N. Lygdamus*. The upper surface of the wings of the female is mostly of the same blue as in the male, through which the spots of the under surface of at least the hind wings may be seen; the apical fifth or sixth of the fore wings is brown, generally merging gradually into the blue and never sharply defined from it; so the anterior portion of the hind wings is of the same brown as far as the subcostal nervure and its middle band, and a narrow line of brown follows the hind border; the apex of the cell is marked by a very narrow, sub-obsolete, transverse blackish bar. Beneath, the wings closely resemble those of the Californian *N. Intiacis*, but the extra mesial series of spots on the hind wings is more uniform, the distance between the second and third spots (from the costal border) being less than usual in this genus. I have only seen this species from Colorado.

6. N. Behrii (*Lycæna Behrii* Edw.; *Lycæna Polyphemus* Boisd.) The upper surface of the wings of the male is of a blue, scarcely differing from that of *N. Oro*, but is not quite so delicate and is slightly darker, with all the veins slightly hoary and so more than usually distinct;

the base of the costal border is also distinctly marked with whitish scales; the dark bordering of the wings is narrower than in any of the other American species of Nomiades, narrowing on the fore wings from in front backward so as to be a mere line below the middle of the wing, and being but a mere line throughout the entire outer border of the hind wing; the tips of the nervules are narrowly blackish; the fringe is blackish at base, whitish beyond, most narrowly interrupted with blackish at the tips of the nervules of the hind wings. The upper surface of the wings of the female, an inspection of which I owe to the kindness of Mr. Mead, resembles that of *N. Couperi*, but the hind wings are more suffused with blue. Beneath, the ground color of the wing is paler than in our other species, being of a delicate pale French gray, slightly darker in the female than in the male; and it differs from the other species also in the contrast between the size of the spots on the fore and hind wings, though a similar but not so striking a disparity may sometimes be seen in *N. Couperi*; on the fore wing these spots, with their rather narrow white borders, occupy each an interspace's width, though the transverse bar at the tip of the cell is reduced nearly to a line; on the hind wings the bar at the tip of the cell would scarcely be noticed but for its white bordering, and the spots are of uniform size, the black pupils reduced to little more than dots with a pale bordering as broad as that of the spots on the fore wings. The only specimens I have seen come from the southern part of California; probably the species does not occur in the middle and northern parts of the State.

It appears highly probable that the species here described is the true *Lyc. Behrii* Edw., though not the species (*L. Maricopa* Reak.*) labelled *L. Behrii* in collections, from the later determinations of Mr. Edwards. It may also be considered the *Lyc. Polyphemus* of Boisduval, a name which Mr. Edwards has placed as synonymous with the *L. Behrii* of his later determinations, *i. e.*, *L. Maricopa*. In the specimens above described, however, the two upper spots of the extra mesial series of ocelli on the hind wing (to which it would seem that Boisduval referred) are not coalesced, devoid of ocelli, and their separation indicated by a dusky nervule. Boisduval's expression is "on voit à la place des deux petits points discoidaux, une tache blanche cordiforme coupée transversalement par une petite ligne noire à peine sensible." He also speaks of the female as brown, without reference to the basal suffusion of the wings with blue.

* This species has sub-marginal markings on the wings.

DESCRIPTIONS AND NOTES ON CERTAIN MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Among several interesting species of Noctuæ, which recent collections in the vicinity of Buffalo, N. Y., have brought to light, is a species of *Gortyna* Hübn. (= *Hydroecia* Led.) allied to *G. nitela* Guen. I have already called attention to the fact that the single European species of *Ochria* Hübn., to which Lederer would restrict the term *Gortyna* (as I believe incorrectly), is distinguished by a clypeal projection, easily perceived if a slender pin is passed along the front, without denuding the head of the insect. The Californian *Ochria Sanzalitæ* is also furnished with a clypeal horn: but the Eastern species are without it, and are all referable to the genus *Gortyna*. Many of the species of this genus are infrequently met with, as a rule; and, even in Europe, seem to be among the rarities. This is perhaps owing to their habits: the larvæ being internal feeders in the stems (*Gortyna* in part) or roots (*Apamea* Ochs. *Hydroecia* Guen.) of plants. Mr. Norman has bred *Gortyna cataphracta* Grote from thistle stems. This latter species has a curious resemblance to the European *Ochria flavago*, but differs generically by the want of the clypeal horn.

Gortyna necopina, n. s.

♂, ♀. Of the same blackish olivaceous with *G. nitela* and *Stibadium spumosum* Grote, with paler hind wings. Everywhere there is an even sprinkling of white scales. These can be seen on the body parts and secondaries, as well as most prominently on the dark anterior wings. No markings on these latter whatever. All lines and spots obsolete. Only the reniform indicated by a deeper color. *The costal white ante-apical dots* are obsolete or extremely minute. Beneath both wings pale, like hind wings above, everywhere pulverulent with white. The legs and under body parts are everywhere powdered with white. This character is here not very conspicuous and becomes unnoticeable when the insect is rubbed, as is the case with my male example. It may be made out, however. The median space of primaries is more sparsely frosted. *Expanse*, ♀, 43 mil.; *length of body*, 24 mil. *Expanse*, ♂, 34 mil.; *length of body*, 17 mil. Collected by Mr. Fischer.

Differs from *nitela* by its less purely olivaceous color, the absence of the t. p. line and inconspicuous costal dots. The thoracic tuft behind the collar is prominent.

Lygranthoecia Meskeana Grote.

I learn that this species has been re described under the name *Heliothis fastidiosa* Strecker.

Xylomiges hiemalis Grote.

I learn that this is the "*Dryobota Californica* Behr. MS.," too briefly described in Mr. Strecker's work for identification, and later than the above name in appearing. The eyes are hairy, not naked, as they should be were the insect a *Dryobota*.

Galgula subpartita Guen.

This species I have collected not uncommonly in Central Alabama. Mr. Belfrage has sent it from Texas, and Mr. Lintner from New York. It has also been sent from California by Mr. Hy. Edwards and Mr. James Behrens. From Illinois Mr. Thos. E. Bean has forwarded me a specimen authentically determined as "*Telesilla vesca* Morrison." This latter name is a synonym; the species of *Galgula* being also generically distinguishable from *Telesilla*.

Hadena quaesita, *n. s.*

This is closely allied to *lignicolor*, but a darker colored species. The ornamentation is similar, the stigmata more distinct, the reniform smaller. The median lines are faint, and seem to occupy similar positions with those in *lignicolor*, but here the t. p. line is more flexuous, being a little bent between veins 2 and 3. The hind wings are blackish fuscous, paler at base, with faint median line, reflected discal spot and light yellowish fringes. Beneath darker than in *lignicolor*. In the new species the color is more blackish brown; over the terminal space the color is, as usual, deeper, relieving strongly the pale W-mark. On a close comparison, the t. a. line is seen to be less strongly produced on submedian fold than in *lignicolor;* the reniform is narrower superiorly, smaller, and less constricted. Else the species might be considered at first sight as a very dark *lignicolor*, with the markings distinctly apparent. The orbicular is pale and reduced. *Expanse* 45 mil. Racine, Wisc., Mr. O. Meske.

Stiria rugifrons Grote.

This species is found to have been unintentionally omitted from the "Check List."

Tarache patruelis Grote. (743 of "Check List.")

A small species taken by myself in Alabama, and sent from Bastrop Co., Texas, by Mr. Meske. Referred here provisionally. Scaly. Fore wings triangulate, shaded ochreous and pale. The ordinary lines very pale and narrow. The most prominent ornamentation an oblique stripe (median shade?) running inwardly from costal angulation of t. p. line to middle of hind margin, and joining an apical streak so that it appears to issue from apex. The stripe is whitish, bordered inwardly with deep ochreous. Outside of it the narrow t. p. line runs divergingly to internal margin. Hind wings pale yellowish white, stained along external margin. The Texan specimen is smaller, more yellowish and paler than my type from Demopolis, which expands 16 mil.

The second part of my Check List of Noctuidæ is delayed by my not having as yet sufficient material in the Deltoids, and I venture to call the attention of my correspondents generally to this fact and to urge the collection of this group the present season. I shall be glad to receive collections of Deltoids from any quarter and will determine and return specimens promptly.

Hypenula, *n. g.*

The moth possesses characters which ally it to *Renia* and *Hypena*. The ♂ antennæ are setose and provided with two longer bristles on each joint. The ♀ antennæ are similar, but the bristles are shorter. The palpi are free, very long, curbed, with elongate second joint, and extend upwardly above the head; they are flattened, rather shortly scaled and seem to be slightly longer in the male. Eyes naked, tibiæ unarmed, vestiture of allied genera. The wings are more elongate than in *Hypena*, much like *Renia*, with full rounded secondaries not exceeded by the abdomen.

Hypenula opacalis, *n. s.*

♂ ♀. Entirely dusky blackish fuscous. Median lines fine, black, denticulate, single. T. a. line outwardly curved. Reniform with two superposed white dots (sometimes obsolete), small, yellowish or dis-

colorous. Orbicular small, discolorous, near the t. a. line. Subterminal line pale, denticulate, continued on hind wings. Terminal sub-continuous black line similar on both wings; fringes dusky. Hind wings blackish fuscous, but little paler than primaries, with a median black shade line. Beneath paler with double rivulous lines, the outer pale shaded; a discal streak on hind wings. *Expanse* 22 to 30 mil. Texas, in May (Belfrage, Nos. 185, 195, 196). Varies in distinctness of the pale shading to the subterminal lines, and by the t. a. line being in one specimen edged inwardly with whitish scales. There appears to be in fresh specimens a very sparse frosting of white scales over the fore wings.

Melanomma auricinctaria Grote.

I have received from Mr. E. L. Graef the second specimen I have yet seen of this little moth. I find that it has ocelli. Notwithstanding its rounded wings, pectinate antennæ, and gray, geometridous ornamentation, it must be referred to the Pyralidæ. It is possibly allied to the Brazilian genus *Cryptocosma* of Lederer; the shape of the wings is, however, quite different. The species can be easily recognized by the black cellular spot, which beneath shows a yellow iris, and by the subterminal line of gilded scales. The tapering smooth abdomen and elongate palpi assist us in referring the moth to the Pyralidæ, while the neuration has not been examined. It appears to be of rare occurrence in New York and Pennsylvania.

Euproserpinus phaeton G. & R.

Dr. Boisduval (Suites a Buffon, 1874, 363) says as to the species which he calls *Macroglossa phaeton*, quoting Grote and Robinson's original description, that he does not know by what chance we changed the name of this species from *crato* to *phaeton*. This remark is based on a misunderstanding. We first described this species as *Euproserpinus phaeton* in our Synonymical Catalogue, Nov., 1865. It had not been previously described. A colored drawing was shown us by Mr. S. Calverley (who had had it engraved with the name), with the information that the insect had received the name of *Proserpinus phaeton* Boisduval in manuscript. We preserved Dr. Boisduval's name, giving him in our paper credit for the species. Afterwards, in 1867, we had a specimen kindly loaned to us by Dr. Boisduval, *two years later*. On this specimen we gave a re-description of the species (under the same name) in September, 1868, Trans. Am. Ent. Soc., giving our views on the structure of

the genus. At about the same time Dr. Boisduval published the species under the name *erato*. This was the first known to us of any other name for the insect. In his last work Dr. Boisduval disavows the authorship of *phaeton*, but adopts the name for the species on our authority. I come to the conclusion that the name "*phaeton*" was transferred from some other species by Dr. Boisduval's Californian correspondent, or that the name "*phaeton*" was originally proposed by some other naturalist, perhaps Dr. Behr or Lorquin.

Oncocnemis Saundersiana, n. s.

Fore tibiæ with a terminal claw. Allied to *Oncocnemis occata* from Texas and California. Differing as follows: Head and thorax black. Median space darker than basal and terminal spaces, which latter are washed with white. Median lines twice further apart inferiorly than in *occata*. Median lines *even*, not scalloped. Median shade black, not very diffuse. Ordinary spots larger: orbicular with an evident dark centre. The dentations of the s. t. line connected, followed by a vivid white line. Fringes wholly black, not checkered as in *occata*. Hind wings much as in *occata*; a terminal vague broad blackish band, within which is seen the median line; fringes white. Beneath less brown than in *occata*. *Expanse* 28 mil. Grimsby (Mr. Pettit). Two specimens.

This is a very handsome, distinctly marked species, easily recognized by the above contrast with its ally. Named for Mr. Wm. Saunders, of London, Ont.

Hadena illata.

Agrotis insignata || Walk., C. B. M., 353.
Agrotis illata Walk. ibid, 742.

From a specimen in the D'Urban Collection, in the cabinet of the Ent. Society of Ontario, determined as "*Agrotis illata*" by Mr. Walker. I find that the insect is a common *Hadena* which I had not hitherto identified with certainty. Whether this name can be sustained for the species I am doubtful, Mr. Walker's description being vague and even contradictory, except as to color.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

POLYHYMNO.

Instead of "extreme tip hooked backwards," as in the generic diagnosis, it would be better to say extreme tip curved outwards.

P. fuscostrigella. N. sp.

On page 247 of volume six, I have described a species as *P. luteostrigella*, which is scarcely an appropriate name, as the streaks are golden rather than luteous. The markings in this species are identical with those of *luteostrigella*, except that the streaks are fuscous instead of golden, though each of them becomes yellow before the apex. In the description of *luteostrigella* it is stated that the streak within the dorsal margin and the inferior branch of the median meet in the apical part of the wing, and then immediately separate and meet again at the apex; perhaps it would be more accurate to say that they cross each other instead of meet and separate, and in some specimens they simply meet and pass around the dorsal margin to the apex together (being margined along the base of the ciliae with yellow); in such cases the space between the two branches of the median streak is streaked with fuscous, which seems to be a continuation of the intro-dorsal streak which has become confluent with or interrupted by the dorsal branch of the median. In both species the third and fourth costal streaks are very oblique, the third pointing backwards and the fourth forwards and converging to the same point, and behind the fourth are two short oblique dark brown streaks pointing backwards to the extreme apex. The account of these streaks in the description of *luteostrigella* is slightly inaccurate and represents one more streak than actually exists. The above account is correct for both species. All of the streaks are confluent before the apex, and all become yellow at or before their confluence, and the caudate tip is yellow, becoming brown at the apex; beneath the caudate tip and opposite to the fourth costal streak is a black dot (not mentioned in the description of *luteostrigella*), and there are in this species two other minute and indistinct ones before it in the base of the ciliae, which at this part

(beneath the caudate tip) have a metallic lustre. *Al. ex.* ½ inch. This species is so similar in the position of its markings to *lutevstrigella*, that it may prove to be the same species, but its greater size and fuscous instead of golden markings induce me to consider them as distinct. Texas; Belfrage.

GRACILARIA.

G. rhoifoliella. N. sp.

Face and palpi white, with the apex of each joint of both pairs of the palpi, and some scattered scales along the under surface brown. Anterior and middle tarsi white, with the joints faintly tipped with brown: tibiae of the hinder pair whitish beneath, and with white spurs tipped with brown; tarsi white. Thorax and primaries brown with a yellowish tinge, but becoming darker brown towards the apex and on the costa near the base, and with bright purplish reflections in some lights: along the extreme costa and sometimes on the fold is a series of dark brown dots: trigonal mark absent: ciliae fuscous: venter white, dusted with dark brown. *Al. ex.* ½ inch.

My first specimens came to the light at the Bee Spring Camp of the Kentucky Geological Survey, near Mammoth Cave, but a few weeks later I bred it in Northern Kentucky from larvae mining the leaves both of the "Poison Oak" (*Rhus toxicodendron*) and the Sumach (*Rhus copalina.*) It mines either side of the leaf, and the mine, at first linear, is at some part of it widened and excavated like the tentiform mine of some species of *Lithocolletis*: sometimes the tentiform mine is not connected with the linear mine. After it has ceased feeding in the mine, it rolls the leaf rather clumsily downward from the tip.

G. inornatella. N. sp.

Palpi white stained with ochreous yellow towards the tip of the second joint, and with an ochreous yellow annulus before the tip of the third; head and antennae white, the antennae annulate with pale yellowish ochreous. Thorax and fore wings white, suffused with pale reddish ochreous, the basal part beneath the fold more whitish: and there is an oblique white fascia before the middle nearest the base on the costal margin. In some lights the wings show a purple gloss. The hind legs are missing in the single specimen before me: the anterior and middle pair are of the general hue on their anterior surfaces and white behind.

and the tarsi are whitish, with pale reddish ochreous annulations at the joints. Perhaps the general hue is more accurately designated pale yellowish or brick red, than reddish or yellowish ochreous, and this hue is as, or more, distinct on the under than on the upper surface of the fore wings. *Al. ex.* a little more than ½ inch. Kentucky in May.

G. Sauzalitaella. N. sp.

Face pale sordid yellowish; vertex whitish mixed with reddish ochreous or rust red; antennae fuscous, in some lights tinged with red and faintly annulate with whitish; palpi, fore wings and thorax rust red, or perhaps as properly reddish brown, appearing in some lights deep reddish orange; the palpi a little sprinkled with white, and the dorsal margin of the fore wings from the base to the ciliae darker, almost fuscous; extreme costa white, with a row of minute brown dots along its entire length and extending around the apex, and a similar line of dots marks the more reddish anterior part of the wing from the darker dorsal portion, and the wing becomes darker towards the apex. The general color resembles that of *G. stigmatella* Fab. and *purpuriella* Chamb., but is darker, more lustreless, and there is no trigonal mark. The under surface of the thorax and the anterior surface of the legs are of the general hue, the tarsi being a little paler and annulate with white. Under surface of the abdomen sordid whitish dusted with brownish red. *Al. ex.* nearly seven lines. The neuration is that of *stigmatella* as figured *Ins. Brit., v. 3.* Sauzalito, California; from Mr. James Behrens.

G. Behrensella. N. sp.

Orange yellow; the palpi a little brownish; the vertex a little pale and the antennae sordid yellowish white with fuscous annulations. There is a small spot on each side of the thorax before the tip, and on the fore wings there is an oblique white streak near the base from the dorsal margin to the fold; behind this is a rather narrow oblique fascia, nearest the base on the dorsal margin, and thence to the tip the wing is much mottled with small white spots, especially along the costal margin, and the yellow color becomes paler towards the tip. Under the lens the white spots appear to anastomose, forming a series of more or less interrupted white streaks, nine or ten in number, perpendicular to the margin and some of them crossing the wing. The apical part of the wing is sparingly dusted with brownish scales, as also are the ciliae, which are pale orange or stramineous. *Al. ex.* ½ inch. California; from Mr. Behrens.

G. basquella. N. sp.

Very near *G. (Parectopa) robiniella* Clem., but still quite distinct. Head and thorax white with an indistinct narrow brown line from the anterior margin of the thorax to the apex; palpi pale grayish or grayish white; antennae brown; legs brown, the tarsi annulate with white; abdomen brown; anal tuft whitish. Fore wings brown, the apical half dusted with white, the dusting becoming more dense towards the apex; there are three costal white streaks, the first near or a little behind the basal fourth; the second is a little larger, and just beyond the middle both of these are oblique and the second is a little curved; the third before the ciliae is smaller and perpendicular to the margin. There is a basal streak just within the dorsal margin, and which extends to the basal fourth of the wing length; a little beyond this and opposite the point of the first costal streak is a rather large obliquely curved white dorsal streak; the second dorsal streak is opposite the end of the second costal and the third dorsal is small, perpendicular to the margin and opposite to the third costal, *from which it is separated by a straight brown fascia*, which appears very distinct in the dusted portion of the wing. Ciliae white with a wide dark brown hinder marginal line extending around their base and another beyond the middle, and a short brown "hook" at their apex. *Al. ex.* 5/8 inch. Collected by Mr. Belfrage in Bosque Co., Texas.

G. sassafrasella. N. sp.

Ochreous yellow; the head and long slender palpi inclining to brownish; the outer surface of the third joint brown except at base and tip, and the fore wings with a purplish gloss; antennae longer than the wings, brownish, faintly annulate with pale ochreous. Fore wings with small black dots chiefly along the margins; three of these are conspicuous, one not far from the base, one near the middle and one near the apex on the costal margin, and opposite the space between the first and second is another on the dorsal margin, and the extreme apex is suffused or dusted with brown. Two (or three?) dark brown hinder marginal lines in the ciliae. The wings are very narrow. Hind wings and upper surface of the abdomen dark slate color. The dorsal portion of the fore wings shows the purple hue much more strongly than the costal. First and second pair of legs brown with white tarsi, which are faintly annulate with purple at the joints; third pair of legs a little paler, with ochreous tarsi and base of femora white. Under surface of abdomen and anal tuft ochreous. *Al. ex.* not quite ½ inch.

For many years I have searched the leaves of the *Sassafras officinale* for "Micro" larvæ, but have never found a trace of one until this summer (June, 1875), when the larva of this species made its appearance in great numbers. It is an ordinary white *Gracilaria* larva, which makes a linear crooked mine, ending in an oblong tentiform mine along the midrib on the under side of the leaf. When about half grown, the larva leaves the mine and rolls the leaves (chiefly the very young ones) downwards into a clumsy imitation of a cone. It pupates in a yellow cocoon on a leaf.

LYONETIA.

L. gracilella. N. sp.

Snowy white with a silvery tinge. Antennae dark brown above, becoming deeper towards the apex, and paler below; palpi white, *stained externally with fuscous:* fore legs with the anterior surface of the tibiae and tarsi fuscous, and the joints of the tarsi of the middle and hind legs annulate with fuscous; upper surface of the abdomen *pale* silvery fuscous. Hind wings and under surface of the fore wings brown, with short yellowish white lines along the course of the fold on the under surface of the fore wings: ciliae of the hind wings and dorsal ciliae of the fore wings *nearly to the tip brown, with strong purple reflections;* behind the middle of the wing length, along the middle of the wing, is a short brown streak, in some lights golden brown, which presents an obtuse angle towards the costa, and the point of which intersects in the middle a brown or golden brown streak or narrow fascia, which crosses the wing at the beginning of the ciliae, is a little concave towards the base, *and is extended along the extreme costa to the base of the wing, and on the dorsal margin encloses a small white spot;* behind this fascia *is an orange yellow patch which extends to the rather large* circular velvety black apical spot; behind the fascia are three short blackish costal streaks in the ciliae, perpendicular to the costal margin, and equally distant from each other: *opposite the last of these, and separated from it by the point of the orange patch, is a rather long and narrow dorsal* black streak also perpendicular to the margin, and between this streak and *the fascia is a short broad fuscous hinder marginal line at the base of the dorsal ciliae.* Costal and apical ciliae silvery white, and *behind the apical spot is a transverse fuscous line across the middle of the ciliae, which sends back through the tip a short and rather indistinct fuscous "hook."* *Al. ex.* a little over ⅓ inch. Kentucky in June.

It is quite distinct from *apici-strigella* Cham., and seems to be between *clerkella* and *padifoliella* as described in *Ins. Brit.*, v. 3. The italics show the points in which it seems to differ from *clerkella*, which is nearer to it perhaps than *padifoliella*.

NEW CALIFORNIAN AND TEXAN MOTHS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

Arsilonche album, n. s.

An easily described species. It differs from *A. absidum* Harvey, which is received in several examples under the number 2734, from Oregon, by being totally white. Expanse 34 m. m. No. 5993, Oregon, Mr. Hy. Edwards' coll.

The synonymy of the several species of this genus is as follows :

1. *Arsilonche albovenosa* Goeze Btr., 3-3 251 (1781.)
Simyra venosa Bkh. iv, p. 716. 1792.
Leucania Henrici Grote, Bul. Buf. Soc. N. S., vol. 1, p. 10 (1873).
Leucania evanida Grote, Bul. Buf. Soc. N. S., vol. 1, p. 10 (1873).
Ablepharon Henrici Grote, Bul. Buf. Soc. N. S., vol. 1, p. 112 (1874).
Ablepharon evanida Grote, Bul. Buf. Soc. N. S., vol. 1, p. 112 (1874).
Ablepharon fumosum Morr., Bul. Buf. Soc. N. S., vol. 1, p. 275 (1874).

This synonymy is given by Mr. Morrison after Dr. Staudinger has identified the American *Henrici* as the same with the European *albovenosa*.

2. *Arsilonche absidum* Harvey.

Ablepharon absidum Harvey, Bul. Buf. Soc. N. S., vol. 2, p. 275 (1875).

This species is lemon yellow, with the t. p. line continued on the secondaries, variably indicated by dark dots. It is very distinct.

Arsilonche album Harvey.

Faspidea viridata n. s.

Fore wings light green, with distinct black lines. Orbicular with a black annulus and central spot. Beneath this is the large claviform, black

margined and with a black dot; these two form a combination like the figure of eight. Cell black powdered between the spots. Reniform large, with green centre, edged with white and with a black annulus, irregular, medially strangulated. Above it the t. p. line seems to join its outer margin, but in reality is obsoletely produced beyond it, appearing below it dentate to internal margin. Terminal space light green; s. t. line obsolete opposite the cell, below black, dentate. Fringes checkered with black. Hind wings white, with lunule distinct beneath and double exterior shade lines and distinct black edging. Thorax scaly; green with black spots on tegulæ.

Expanse 30 m. m. No. 5605, San Diego, Cal., Mr. Edwards.

Agrotis æqualis n. s.

♀. Allied to *Wilsoni* and especially resembling some of the varieties of that species, but distinguishable by the subterminal line not being twice more prominently indented, but pale, dentate throughout its length, and by the concolorous terminal space and larger stigmata. Hoary olivaceous fuscous with a tinge of brown: claviform indicated; orbicular large, irregularly elongate; reniform wide; the cell shaded with brown; t. p. line geminate, regularly lunulate. Fringes brown, discolorous. Hind wings fuscous, deepening in tint outwardly, with pale, faintly interlined fringes and long narrow discal streak; beneath whitish, irrorate on costal region, with faint terminal shade and discal mark; primaries fuscous. Thorax and head concolorous with fore wings.

Expanse 38 m. m. California. No. 101, Mr. Hy. Edwards' Coll.

Agrotis satis, n. s.

♀. A small species resembling *æqualis* in coloration; fore wings more deeply tinged with red brown. A sub-basal brown streak; median lines geminate, denticulate; t. a. line perpendicular; t. p. line rounded opposite cell and there denticulate. Some black dots before the s. t. line; terminally the wing shows a deeper shade; the paler fringes broadly interlined. Hind wings fuscous, without marks, with pale interlined fringes. Beneath fuscous with common line determinate on veins and discal dots; that on primaries contiguous to the line. Collar with a marginal brown line; head and thorax concolorous with wings.

Expanse 28 m. m. No. 3486, California, Mr. Hy. Edwards' Coll.

Agrotis choris, n. s.

♀. Hind wings pellucid white, a little stained; veins marked. Fore wings uniform dull gray; veins obsoletely marked. T. a. line geminate, denticulate, fine, black. Orbicular black ringed, small, rather elongate. Reniform narrow, curved; claviform obsoletely indicated. T. p. line obsolete, marked on the veins. S. t. line faint, near the margin; terminal line black, interrupted; fringes concolorous. Antennae brush-like; head and thorax like fore wings; palpi darker at the sides.

Expanse 36 m. m. Nevada, No. 2626, Coll. Mr. Hy. Edwards.

Agrotis Sierræ, n. s.

♀. Allied to *haruspica*; differs by the paler secondaries and more slender habit. Body and fore wings uniformly fuscous; lines black illegible. Both stigmata present; orbicular rounded; reniform elongate lunate. Hind wings beneath with discal mark and shade line; above immaculate, pale, pellucid, fuscous. Abdomen as dark as thorax.

Expanse 45 m. m. No. 2623, Sierra Nevada, Cal.; Mr. Hy. Edwards Coll. I regret that I have not been able to compare this form with the European *augur*.

Agrotis recula, n. s.

♀. The smallest species of the group of *4-dentata* and *cicatricosa*. Hind wings white, soiled with fuscous. Fore wings nearly black, with a yellowish stripe from the base outwardly below costa to above the prominent yellow stigmata. Orbicular spherical; reniform of the usual shape, rather broad, approximate to the dotted t. p. line. A splash of yellowish below median vein to the s. t. line, which is black dotted, followed by yellow with two yellow teeth to veins 3 and 4. Beneath whitish with the spots reflected on primaries.

Two specimens. Oregon, No. 5969, Mr. Hy. Edwards' Coll.

Agrotis pyrophiloides, n. s.

A species with slender body and wide wings, and looking like a *Pyrophila*, but with spinose hind tibiae. Greasy; fuscous and dirty ochre, with wavy blackish lines. Orbicular of the ochreous ground color, concolorous, rounded; median shade blackish, heavy; reniform concolorous; t. p. line geminate, with pale included space, denticulate. Costal dots distinct on the blackish subterminal space. A terminal festooned ochreous line, cutting the black line at base of fringes. In one

specimen the ornamentation is obliterate. Body concolorous; hind wings fuscous, paler at base. Beneath paler with common line and discal marks, that on primaries elongate and near the line.

Expanse 38 m. m. No. 5662, California; No. 5624 var., Mr. Hy. Edwards' Coll.

(To be Continued.)

ADDENDA TO LISTS OF DIURNAL LEPIDOPTERA, SPHINGIDÆ AND ZYGAENIDÆ OCCURRING ON THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

RHOPALOCERA.

Colias philodice Godart, var. *laurentina* Scudd.

In the end of July, 1874, I took a *Colias* on Montreal Mountain, which appeared to me to be different to anything I had hitherto seen. I sent it a short time since to Mr. Scudder, who kindly determined it for me as a Gynandromorphic ♀ of his var. *laurentina* of *philodice*. A second example, also a ♀, was taken by Mr. Pearson the same season.

Thecla agustus Kirby.

One specimen taken by Mr. Kollmar, May 24th, 1875.

Lycæna neglecta Edw.

I took a ♂ of this species June 26th, 1875. It was in beautiful condition, evidently fresh from chrysalis, and is the only example I have seen from this locality.

Euphyes metacomet Harris.

The *Hedone orono* of my List, CAN. ENT., vol. vii, p. 89, must be referred to this species. I received both these species from Mr. Herman Strecker, of Reading, Pa., along with some other material, accompanied by a list giving the names. Unfortunately, when referring the examples to the list I mistook the numbers, and gave *orono* instead of *metacomet*

I have, however, taken *ovina* here, as Mr. Strecker wrote me that there was a specimen of it in a box of Lepidoptera that I sent to him in 1872. It is very rare, as I have not met with it since.

HETEROCERA.

SPHINGIDÆ.

Lethia gordius Cram.

One example; Mr. Pearson.

ZYGAENIDÆ.

Alypia Maculiochii Kirby.

Two examples; Mr. Knetzing.

CORREPSONDENCE.

DEAR SIR.—

In the October No. I find an account of Mr. Dimmock's method of denuding the wings of Lepidoptera. From the account given, it seems to me that it will take as much time, though perhaps less trouble, than the old way of denuding them with a moistened brush. It may, however, answer for butterflies and the larger moths, but for Tineidæ, Tortricidæ, Pyralidæ, and the smaller moths generally, the plan of which I have given an account in a previous volume of this magazine seems to me preferable. It is as follows: Take a piece of glass about one inch by three in size (say a glass "slide" of a microscope), place the wing on it, in from one to three or four drops of strong solution of potash, according to the size of the wing; cover with one of the thin pieces of covering glass of microscopists (do not use enough fluid to float the cover glass); hold, with a clothes pin or other small forceps, the large glass over a lamp chimney until it begins to boil, removing it at the first sign of ebulition, when the wing will be found denuded if it is a fresh and small specimen; if large, or old and dry, a little longer boiling may be necessary. The fluid may then be drained off by tilting the glass a little, and all traces of the potash removed by adding a few drops of water; and the cover glass being removed, the wing may be mounted on the same glass or floated on to another, or it may be at once accurately sketched by the microscope and

camera lucida. The whole process of mounting may be accomplished in a minute or little more, or it may be mounted and sketched in five minutes or less. In this way I have mounted and sketched hundreds of wings of Tineidæ, which I hope some day to publish in the pages of the CAN. ENT.

V. T. CHAMBERS.

Colorado Springs, Colorado, Feb., 1876.

ENTOMOLOGICAL NOTES.

DEAR SIR,—

Ceratomia quadricornis.—I have during the past season, and for the first time in my life, taken a number of the larvæ of *Ceratomia quadricornis* Harr., of a brown color. Out of five taken in one locality, four were of a deep brown. The fifth was of the usual green hue. These larvæ were about half grown when captured. This was early in September, but since then I have taken several other specimens, the majority of which were brown. I should like to learn whether any of your readers have, at any time, made similar captures.

Doryphora 10-lineata.—A safe and effective method of destroying this beetle is to drag an ordinary butterfly net over the haulm when the larvæ and beetles are feeding. By this method, and without making any particular effort, I captured on Long Island, this year, over five hundred specimens in about as many minutes. By making a sort of drag net, large enough to be worked by two boys, a much larger number could of course be captured in a given time. I have no doubt that Long Island will be plentifully supplied with *10-lineata* next year; for, although thousands were drowned and washed up on the beach at Coney Island and elsewhere, the number that escaped must have been great. But, although admitting the desirability of ridding ourselves of this pest, I by no means admit that it is the scourge talked about by some Entomologists. As I intimated before, we had plenty of them on this Island, but no one complains of a small crop of potatoes in consequence.

W. V. ANDREWS.

36 Bœrum Place, Brooklyn.

ERRATA.—On page 16, line 7 from top, for *Heliophila renipuncta* read *H. unipuncta.*

The Canadian Entomologist.

VOL. VIII. LONDON, ONT., MARCH, 1876. No. 3

NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part I.

BY W. H. EDWARDS, COALBURGH, W. VA.

My attention having recently been drawn to the "Historical Sketch of the Generic Names Proposed for Butterflies, a Contribution to Systematic Nomenclature, by S. H. Scudder, Salem, 1875," in which some hundreds of names have for the first time been advanced, I was led to investigate for myself the sources whence part of them were derived, especially the works of Hübner. And the conclusion to which I have come respecting many of these newly proclaimed genera being directly the reverse of that of the author of the Sketch, I desire to state the case for the consideration of the readers of the ENTOMOLOGIST, who may naturally be supposed to feel an interest in whatever concerns any branch of Entomological nomenclature.

1. I have before me what purports to be a fac-simile of Hübner's Tentamen, "reprinted by Samuel H. Scudder, Cambridge, U. S. A., 1873." It comprises a single leaf, without date, the printed matter measuring 7 x 9 inches, and covering both sides of the leaf; and is entitled Tentamen determinationis digestionis atque denominationis singularum stirpium Lepidopterorum, peritis ad inspiciendum et dijudicandum communicatum, a Jacopo Hübner. An Attempt at Classification of the several groups of the Lepidoptera, communicated to skilled persons to be examined and pronounced upon.

In this Attempt, the Lepidoptera of all orders are divided into Phalanxes, Tribes, and a farther division not named, but which, from the analogous arrangement in the Verzeichniss bekannter Schmetterlinge, are Stirps; and so far as relates to the Butterflies, the classification is as follows:

Phalanx I. Papiliones.

Tribus I. Nymphales.

I. Nereïdes—Nereïs Polymnia.
II. Limnades—Limnas Chrysippus.
III. Lemoniades—Lemonias Maturna.
IV. Dryades—Dryas Paphia.
V. Hamadryades—Hamadryas Io.
VI. Najades—Najas Populi.
VII. Potamides—Potamis Iris.
VIII. Oreades—Oreas Proserpina.

Tribus II. Gentiles.

I. Rustici—Rusticus Argus.
II. Principes—Princeps Machaon.
III. Mancipia—Mancipium Brassicae.
IV. Consules—Consul Fabius.
V. Urbani—Urbanus Malvae.

At the end of the paper we read: Ne expectet quis, ordinem hanc nullam amplius correctionem esse desideratum. Let no one suppose that this arrangement will require no farther correction. Hübner did his own printing and this leaf was for his own use and for certain of his learned friends to examine and give him their opinions upon. He gives the following account of the origin of the Tentamen in the Preface to the Verzeichniss bek. Schmett.: "Though many systematic works upon the Lepidoptera have already appeared, yet none exists wherein all the known species are properly classified. This circumstance compelled me, ten years ago, when I began to extend my works from European to exotic species, to *sketch for myself a systematic Catalogue* of those various species, in order to be able to begin my contemplated Sammlung Exot. Schmetterlinge. *This Sketch I immediately printed under the title Tentamen, &c., in order that it might be examined and judged of by competent persons before I adopted it.*"

In Silbermann's Revue Ent. 1833, T. 1, p. 101, is given by M. Geyer, who was assistant to Hübner in his publishing from 1818 to 1833, and who continued the works of Hübner after the death of that author, a list of Hübner's works, as follows:

1. Geschickte Europ. Schmetterlinge.
2. Sammlung Europ. "
3. Sammlung Exot. "

4. Zutraege zur Sam'l. Exot. Schmett.
5. Verzeichniss bekannter Schmetterlinge.
6. Systemat. Alph. Verzeichniss zur Samml. Europ. Schmett.

Of these, No. 3, begun 1806, was continued to 1833 by Geyer.

Vol. 1, 413 pl., title, Index, and 12 pages text.

Vol. 2, 225 pl., title, Index.

Vol. 3, 21 pl.

Of No. 4, begun 1818, continued to 1833, were published Vols. 1, 2, 3 and 34 pl. of iv., but without text. No mention is made in Geyer's list of the Tentamen.

In Thon's Entom. Archiv., Jena, July, 1827, Vol. 1, p. 28—30, Geyer has given a biographical sketch of Hübner, in which he states that Hübner was first a designer in a cotton factory near the Moldavian frontier; was entirely self-taught, but studied the Lepidoptera diligently. That Geyer became acquainted with him and worked with him from 1818 onward, and he continues thus: "but as in the beginning Hübner felt the necessity of a natural system to be able to give accurately the limits of all groups of the Lepidoptera, he printed a *provisional sketch* after the principles of Linné, Fabricius and Schiffermueller, *on a quarto sheet, which later was enlarged and published with the title Verzeichniss bekanter Schmetterlinge*, 1816, 8vo. *What he believed erroneous in this work* (Verzeichniss) *he tried to amend in his Lepid. Zutraege*," published 1820. Geyer then gives a list of Hübner's works, same as that given in the Rev. Ent. before cited, and makes no mention therein of the Tentamen. Mr. Scudder, Hist. Sketch, p. 98, speaking of the Tentamen, says: "It is also included by Geyer in his list of Hübner's works." What Geyer says we have seen. The Tentamen is included in neither of his lists of Hübner's works, but apart from the list, in Thon's Archiv., a "provisional sketch," not even specified as the Tentamen, is stated to have been made, which later *was published as the Verzeichniss*. The very word used by both Geyer and Hübner—a sketch—implies incompleteness, and means a rough draft, an outline, and cannot possibly be construed to mean a "work," which is a completed structure, and in this case a completed book. Dr. Hagen calls my attention to the fact that Geyer's words, as well as Hübner's own in the Preface to the Verz., (er machte bekannt.) to-day mean *published*, but that formerly they were applied to any printed slip, *and as used by Hübner and Geyer are equivalent to "printed,"* as I have translated them. The difference between printing and publishing I need not dilate upon,

Such, then, is the history of this now celebrated sheet, printed in 1806 by Hübner as a Sketch, or rough draft, for his own use and for the examination of some learned persons, expressly stated by him to have been subject to their approval *before even he himself would embrace it*, never known to have been approved by any one, never claimed to have been more than a "provisional sketch" or draft of the book which in 1816 was published as the Verzeichniss, and which differs materially from the draft, as would any completed and published book or paper from the original draft of same, discovered by Mr. Scudder seventy years after it was printed and nearly as many after it had been forgotten, and proclaimed by him as an authority in nomenclature, not only over the Verzeichniss, which is its other self, but over all works of Hübner, and all works of all authors since 1806, superseding—wiping out as with a sponge—the labors of three generations of Entomologists. And plainly, if this little Sketch can claim of right such prodigious distinction, the nomenclature of every department of Natural Science is at the mercy of any leaf or printed slip which may hereafter be discovered in the attics or the junk-shops of the civilized world. It becomes us therefore to scrutinize this sheet closely.

Mr. Scudder relies upon the mention of the Tentamen in the Verzeichniss, and upon a reference to what is understood to be the Tentamen in the preface to the Lepid. Zutraege, but in which the name or the title does not appear; also to a reference by Ochsenheimer, and later by Dr. Hagen in the Bibliotheca Entomologica, 1862, as evidence that it was known to Entomologists for years as an existing work, *and by implication that it was recognized as a work having authority.*

Hübner's own references, whether direct or indirect, proved nothing, and as to that in the Biblioth. Ent., Dr. Hagen informs me that when he mentioned the Tentamen in that work, he had never seen it, and knew it only from Ochsenheimer's mention, and now that he has seen it, he is explicit in his rejection of it as having either authority or value.

Ochsenheimer, Schmett. Eur. iv, 1816, says: "Hübner has under the title Tentamen, &c., published on a quarto sheet a sketch of a system of Lepidoptera, in which to the divisions adopted by him are given generic names of unequal value. Hubner seems to be aware of this himself, for he says in concluding, 'let no one suppose that this arrangement will require no farther correction.' *This sheet I saw only long after the printing of my 3rd Vol. was done.*" This was then after 1816, as

Ochsenheimer's 3rd Vol. bears date that year. Mr. Scudder has inadvertently copied this as 1st Vol., 1807, instead of 3rd Vol., 1816. So as Dr. Hagen, in a note, says, "the Tentamen was not known to the chief Lepidopterologist of his day for ten years or more after it was printed, though he was in intimate communication with Hubner, and that he did not know it shows clearly that Hubner did not think it of importance enough to be communicated to him."

Herrich-Schaeffer, in different Regensburg pamphlets, 1857 1869, states that he has bought all the plates, books and scientific material belonging to Hubner, and will continue Hubner's works. He gives a list of them, with dates of their original publication, and includes the Verzeichniss bek. Schmett., and the Syst. Alph. Verz. (which is another catalogue), but says not a word of the Tentamen, the best proof that he did not regard it as a scientific publication.

Dr. A. Speyer, Ent. Zeit. Stett., 1875, Vol. 36, p. 98, thus expresses himself: "Grote swears by the priority principle and has vigorously carried out the same, not only in regard to species, but to genera and higher divisions. He has laid hold of a yet older catalogue of Hubner's than the Verzeichniss in the Tentamen, &c. *I have never met with the Tentamen, which, according to Ochsenheimer, contains a plan of a system of Lepidoptera, on a quarto sheet, and neither I presume have most of my readers. I have therefore been obliged to pass no judgment on the right of those generic names to supersede later ones chosen by Hübner himself or by others.*"

"The Tentamen is not recorded in the large yearly Index of all German publications," as I am informed by Dr. Hagen, "published at Leipzig, which Index is regarded as the most correct existing." And the same distinguished Entomologist also assures me that he himself "has most of the catalogues of the libraries belonging to prominent Entomologists, and which have been offered for sale during the past forty years, *and the Tentamen is not mentioned in one of them*, not even in those of Zincken-Sommer, Charpentier and others who were contemporaries of Hubner and were prominent and accomplished Lepidopterologists. These men and Ochsenheimer and Germar were the '*peritis*' of their time and there is no evidence that one of them had seen it: and," adds Dr. Hagen, "*a work in nobody's hands, printed for private purposes, cannot be considered as a scientific publication.*"

So that this sheet, so far as appears, was known to German authors,

who of all the world might have been supposed likely to have been familiar with it if it ever had been published or had any scientific value, only by the mention of it in the Verzeichniss, of which it was the original sketch, or from the mention in Ochsenheimer, who says he did not know of it till after 1816, that is, till after the Verzeichniss was published, and through the mention in the preface of that work he probably got his first information about the Tentamen.

And it is worthy of notice that from 1806 to the present day, *scarcely one of the German lepidopterists have recognized any of Hübner's works as authoritative in nomenclature.* This movement in favor of Hubner originated in England with a small number of authors, and quite lately has been extended to the United States by the efforts of Messrs. Scudder and Grote.

In the year 1842, the British Association appointed a Committee composed of the most eminent zoologists of the day, to draw up and report a code of Rules "by which the nomenclature of zoology may be established on a uniform and permanent basis." The committee submitted to the Association a series of propositions that same year, 1842, which were adopted. In 1845, a Committee appointed by the Association of American Geologists and Naturalists, adopted the rules of the British Ass'n with slight alteration.

Rule 12 reads as follows: "*A name which has never been clearly defined in some published work should be changed for the earliest name by which the object shall have been so defined.*" And in the explanatory text accompanying, the Committee of the Br. Ass'n say: "Two things are necessary before a zoological term can acquire any authority—*definition* and *publication. Definition properly implies a distinct exposition of essential characters, and in all cases we conceive this to be indispensable. To constitute publication nothing short of the mention of the above particulars in a printed book is sufficient to authenticate a genus. . . . . Nor can any unpublished description, however exact, claim any right of priority till published, and then only from the date of publication.*" In a printed book! Not on a stray slip nor on a loose sheet, nor in the columns of a newspaper, but in a book, that its permanence may be assured and that it may be known of by all men.

Geyer says that Hubner published his provisional sketch in an enlarged form as the Verzeichniss: and Hubner says "let no one suppose that this arrangement will need no farther correction." And accordingly we

see that Hubner does not use the names of the 13 secondary divisions of the Papiliones of the Tentamen at all in the Verzeichniss. The species *Polymnia*, for instance, stands in the former as "*Vereis Polymnia*:" in the latter it is *Mechanitis Polymnia*: *Potamis Iris* is changed to *Apatura Iris*, and so on through the entire list. And only a part of the Stirps of the Tentamen are retained in the Verzeichniss, five of them, namely, all the Gentiles, being changed for others, as *Principes* to *Archontes*, &c. Moreover, one Stirpsin addition is given to each Tribe.

Yet the author of the Sketch, in disregard of Rule 12, has given the names of these 13 secondary divisions of the Tentamen as so many names of genera, crediting them to Hub., 1806. Thus *Vereis* Hub., 1806; *Consul* Hub., &c., adding to each the species accompanying it in the Tentamen, with the words "sole species and therefore type." These names have never been used, and several were dropped by Hubner himself, but the systematist of to-day must *reinstate* them, as he terms it, as if they had ever had one moment's standing, and claims for them an honest priority over the labors of other men. And not only has Mr. Scudder given a set of names based upon these divisions of the Tentamen, *but a complete set of other names for the equivalent divisions of the Verzeichniss.* Thus Hubner, as I have said, changed all the Stirps of the Gentiles, *Principes* into *Archontes*, *Rustici* into *Astyci*, &c., and we have in the Hist. Sketch a genus *Princeps* and a genus *Archontes*, a *Rusticus* and an *Astycus*, each pair in Hubner standing for precisely the same thing. But apparently to escape the appearance of their duplication, the last set are attributed to "Franck's Catalogue," a production much subsequent to the Verzeichniss and of which I will speak presently.

But to return to the Tentamen. In the Hist. Sketch we read "*Potamis* Hub. Tent., 1806; *Iris* sole species and therefore type. This name never since used must be restored." "See *Apatura*." Turning over the leaves we find "*Apatura* Fab." and three species ranged under it, *Iris*, *Bolina* and *Alimena*, and read: "in 1806 Hubner (Tent.) selected *Iris as type of Potamis. Consequently Apatura must be restricted to the other two, which are congeneric, and Bolina may be taken as the type. This, however, is not in accordance with subsequent usage* (from 1806), *as will be seen by the following*," &c. And then are given a dozen authors, including Hubner himself in the Verzeichniss, nearly every one of whom has employed *Iris* as the type of *Apatura*. And Mr. Scudder adds with amusing naiveté, "this result is from want of familiarity with Hubner's Tentamen!"

Beyond a question, the Tentamen, though historically interesting, or as a curious fossil, has not the least value as an authority for nomenclature, and these 13 genera set up by Mr. Scudder must come down.

The other Phalanxes of the Tentamen, and which cover about 80 per cent. of that sheet, relate to the Heterocera, and I shall not say more of them at present than that they one and all are subject to the same fatal objection with the Papiliones; and any system of arrangement based upon these divisions is worthless.

2. In the year 1825, a certain collection of Lepidoptera owned by the late M. Franck was offered for sale by his widow, and Hubner was employed to draw up a sale catalogue, a copy of which, from the Mus. Comp. Zool. Camb., I have examined. It is entitled "Catalogue de feu M. Franck, cette collection est en vente chez Mme. Ve. Franck, a Strasbourg." Near the end is a classified list of all the species embraced in it, divided according to the Stirps of the Verzeichniss, merely the names and the habitat being given, as *Archon Polydamas* L. Brazil, *Astycus Proteus* L. Surinam. *Now these names are not generic names in this Catalogue unless the Stirps names in the Verzeichniss are also generic names.* They, as well as the Stirps names, are given to what modern systematists call a Family or sometimes a Sub-Family. For example, *Andropodum* in this Catalogue embraces 44 species, including all the modern genera of the Family or Sub-Family Pieridæ, as *Pieris*, *Anthocharis*, *Colias*, *Terias*, *Callidryas*, *Gonepteryx*; and it is identical with the Stirps *Andropodum* of the Verzeichniss. Under *Archon*, which is equivalent to Papilionidæ, stand *Papilio*, *Leptalis*, *Thais*, *Parnassius*, and so on. It is plain, therefore, that these names are in no sense names of genera. And yet Mr. Scudder has set up several of them as names of genera, being, as I have mentioned before, all those which Hubner substituted in the Verzeichniss for the names of the Tentamen. But instead of taking them directly from the Verzeichniss, he seems to have adopted a round-about method. On page 93 Hist. Sketch, he says: "Only those names" (of genera) "are introduced which are connected with the binomial nomenclature founded by Linné; for this reason the trinomials of Hubner" (such as *Oreas nubila Norina*, *Andropodum fugax Palaeno*, etc., astonishing appellations used in the iconographic works of Hubner) "and other writers have been totally disregarded. *All or nearly all the trinomials of Hübner are actually used by him in some work or other, in the Tentamen or Franck's Catalogue, with a binomial application, and in those cases they are here introduced, but only dating from the time at which*

and for the species for which they were employed binomially." Now, here is *Andropodum* in Franck's Catalogue, precisely the equivalent of *Mancipium* of the Tentamen (which latter is already set up as a genus in the Sketch and stamped Hüb., 1806), and is substituted for it in the Verzeichniss, employed to cover 44 species belonging to many genera. Mr. Scudder pounces at random on one of these, which happens to be *Ilaire*, and stands it up as type of the new-old genus *Andropodum* Hüb., 1825, not taking the trouble to first pull down *Mancipium*. I have not examined the Zutraege, and for aught I know there may be a third equivalent of *Mancipium* found there, which also is one of these genera. Geyer says that what Hübner thought erroneous in the Verzeichniss he tried to amend in the Zutraege, and he may not unreasonably have seen fit to amend his Stirps' names the second time. Certainly, had he done so, we should have triplicate genus names in the Hist. Sketch. For some reason not stated, Mr. Scudder has attributed the name *Archon* type *Machaon* to the Syst. Alph. Verz. 1825, instead of to Franck's Catalogue, 1825, where its compeers are found, in disregard of his own statement before quoted as to the use of the trinomials—for in the Syst. Alph. Verz. the species *Machaon* stands as *Archon heroicus Machaon*.

Of course Franck's sale Catalogue, as regards authority in nomenclature, does not differ from Deyrolle's (Paris) sale Catalogue, or that of any other professional dealer in insects. I have a catalogue of a dealer in flower seeds, from Ipswich, England, in which all the names are arranged under the latest approved botanical system, and accompanying each is a brief indication of the habit, color and nature of the plant. This catalogue would scarcely be allowed by Dr. Gray to have authority in botanical nomenclature, and yet it has as much claim to that dignity as this Franck Catalogue, and in fact more, as it gives some sort of description of each plant mentioned.

We may infer, then, that zoologists have not merely to rummage for drafts and printed slips, but for sale catalogues as well, before they can reach the right basis of their nomenclature!

In the Historical Sketch are about 40 other genera attributed to Hübner on such authority as Syst. Alph. Verz., Index, Sammlung, exclusive of a host based upon the coitus of the Verzeichniss bekannter Schmetterlinge, and these one and all will be found to bear examination no better than the so-called genera from the Tentamen and Franck's Catalogue. They all lack the essential qualities of genera, being taken

from works in which they stand as bare names, undefined and undescribed.

3. In the Preface to the Historical Sketch we naturally look for a statement of the plan upon which the author has worked, and the principles on which he relies for the correct exposition of generic names. And we read that he adopts in general—not the rules of the British Association—but those principles regarding genera enunciated by Agassiz, and more recently by Dr. Thorell in his work on European Spiders, "*with such exceptions and modifications as are indicated in my Canons of Systematic Nomenclature*" (published in Am. Jl. Sci. and Arts, May, 1872). Agassiz not being at hand, I turn to Thorell as quoted by Wallace, Anniv. Address, p. 10, and read: 1. "*There must be definition and description and publication. A recognizable figure of a species is sufficient, but of a genus there must be a description pointing out the generic characters.*" And Thorell adds: "*A new genus that has been distinguished merely by referring to some particular species of an older genus as its type, without in any way indicating which of the* CHARACTERISTICS OF THE SPECIES IS TO BE CONSIDERED AS THE MARK OF THE NEW GENUS, NO ONE CAN BE LOOKED UPON AS BOUND TO ACKNOWLEDGE. Nevertheless, it appears to me advisable to do so if the species referred to deviate in any generally known way from the typical species of the old genus, and always if the new genus has been once received and acknowledged." With the proposition laid down in the first part of this clause I fully agree, and it is in accord with the Rule of the Br. Ass'n. The last part is advisory, and taken with the other, means that while Dr. Thorell would concede a standing to genera already adopted and in use, he would require definition and description and publication in future, and would permit no genus to be based on a mere reference to a type, except in one extraordinary case, that of a well known variation from the typical species of the old genus. This advisory clause expresses an individual opinion and is propounded for the consideration of naturalists. But were it a law, it would afford scanty support to these new Hübnerian genera. There is no evidence that in any one of those taken from the Tentamen or from Franck's Catalogue, etc., the typical species designated by the author of the Hist. Sketch differs in any generally known manner from the remaining species of the old genus, and certainly these genera have not been received and acknowledged.

And what are the "exceptions and modifications" indicated in Mr. Scudder's Canons? Canon 3 reads: "The mere enumeration of its

members when known is a sufficient definition of the limits of a group and gives it an unquestionable right to recognition." That looks rather like a reversal of Dr. Thorell's Rule than a modification of it, and it is the foundation on which these late innovations rest. What right has any man to lay down a Rule or propound a Canon at variance with the received Code, and then assume that his Rule or Canon has the force of law? The Rules of the British Association were adopted by the representatives of the different branches of zoology, assembled in convention, and they have been accepted and acted upon. If any of them need modification or repeal, such change must proceed from as high an authority as that which enacted them. We may reverence or respect the opinions of an Agassiz, or a Thorell, or a Scudder, but in these matters to consider opinions as so many laws would be to establish a dangerous precedent, and cannot for one moment be tolerated.

Under another of these Canons Mr. Scudder has undertaken to apply the rule of priority to groups higher than genera, as follows: "In any subsequent alteration of the limits of a group its name must never be cancelled." And accordingly we are requested to introduce a host of barbarous family and stirps names, to the utter confusion of the received nomenclature of the higher groups. The Committee of the Br. Ass'n, on the contrary, not intending to apply the rule of priority to these groups, recommended "that the assemblages of genera termed families should be uniformly named by adding the termination *idæ* to the earliest known or most typically characterized genus in them, and that the subdivisions termed sub-families should be similarly constructed with the termination *inæ*." And this recommendation has been accepted and generally acted on because this mode of designating families and subfamilies, being uniform and an aid to memory, was found eminently convenient. It was regarded as a vast improvement on the fantastic and heterogenous names of the earlier authors and of Hübner especially. But the effect of this Canon would be to swamp our nomenclature with such terms as armati and hypati, argonautae and moderatæ, adoleocentes and terribiles, frugalia and voracia, and hundreds more equally absurd. And already we find the writings of Mr. Scudder defaced and obscured by them. This is making progress backwards, and in my opinion is as sensible as if we were to surrender the Indian numerals for the letters of Rome, or the notation of chemistry for the hieroglyphics of the alchemist, or railroads for buck-boards and pillions.

And although this Canon purports to relate only to groups higher than genera, the same reasons which would favor such an application cover genera also. And accordingly we find of late several entomological systematists wholly ignoring the Rule which requires definition of genera, and in the most reckless fashion indicating genera by the mere mention of types.

Of the 1,104 generic names in the Hist. Sketch, 283 are taken from the Verzeichniss bekannter Schmetterlinge, a work of which I propose to speak in a subsequent paper, and 57 are taken from the Tentamen and other works of Hübner, making a total of 340, or about 30 per cent. Scarcely one of all these can stand without displacing a name applied, with requisite definition and publication, by Doubleday, Boisduval, Westwood and other eminent authors, and the aggregate represents a vast sum of injustice.

NEW CALIFORNIAN AND TEXAN MOTHS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

(Concluded from February No., Page 38.)

Hadena Dunbari, n. s.

Eyes naked, tibiae unarmed, tufting of body obsolete, so that it approaches *oligia*, but is stouter than those species. Fore wings light gray, basal line black, distinct; t. a. line geminate, black outwardly and white inwardly, irregular; t. p. line geminate, produced above, the reniform, curved outward, joining the reniform inferiorly. Median shade black, distinct. Orbicular round, white, with black annulus, with a dark centre; reniform subquadrate, black margined, having a carneous centre; claviform outwardly well expressed, concolorous, with a black border; s. t. line white, dentate, preceded by a black streak, obsolete opposite the reniform; an apical black streak. White dots on the costa in the s. t. space. Terminal line black, fringes concolorous and finely cut with white. Beneath cinereous; light outer border with terminal line well marked. Median shade quite evident on costa; alternate white and black costal marks. Hind wings smoky white, veins soiled, fringes

white. Beneath concolorous, a discal lunule, with median and terminal lines obvious. Body concolorous: collar with a black line: black line at base of thorax: beneath, thorax and legs of a lilac shade. Abdomen whitish brown.

Vancouver Island, No. 5582, Coll. Mr. Hy. Edwards. Named for Dr. George W. Dunbar, of Buffalo, a zealous collector.

Hadena chlorostigma, *n. s.*

Eyes naked. Thorax blackish brown, tufted, edged with black: collar brown: sides and dorsal surface of body tufted. Primaries black, tinged with green; basal half line greenish; t. a. and t. p. lines narrow, black, geminate, accompanied by pure white shadings. In the character of the median lines this species resembles *chalcedonia* and *versicolor*. Median shade noticeable, blackish. Orbicular spot round, concolorous, ringed with black: reniform subquadrate, green, moderate, bordered with black: claviform minute, black. Beneath blackish, pale, irrorate: straight median line: discal spot on the line. subterminal fuscous shade: white spots on the costa, near the apex. Secondaries smoky, black, beneath median line denticulate, followed by subterminal fuscous shade: fringes short, paler.

Expanse 22 m. m. May 22nd, No. 544, violet label; G. W. Belfrage, Texas.

Perigea niveirena, *n. s.*

This species is of a mottled fuscous with distinct black, single waved transverse lines: the small reniform outwardly white margined. Subterminal line white, dentate, preceded by a blackish shade. Hind wings fuscous, paler beneath, with even common shade line and discal spot. Body concolorous.

Expanse 30 m. m. Vancouver Island, No. 5621; California, No. 5199, Coll. Mr. Hy. Edwards.

Gortyna obliqua, *n. s.*

♂. Resembles the Eastern *G. nitela*, but the pale t. p. line is more oblique, angulated immediately on costa. The color is more reddish brown. T. a. line outwardly angulate on median vein, thence downwardly straightly to internal margin, thus narrowing the median space inferiorly. Stigmata visible, paler than the wing, rounded. Subterminal

line a light shade line, twice angulate, nearly opposite the cell and on inferior border. Subterminal space lighter than the stigmata. Hind wings pale, beneath with faint dot and line.

Expanse 36 m. m. No. 4410, California, Coll. Mr. Hy. Edwards.

This is the first Californian species congeneric with the Eastern species referred by Guenée and Grote to *Gortyna*. The clypeal spine of *Ochria* is absent.

Caradrina flavimaculata, n. s.

♂. Wings elongate; primaries narrow, secondaries wide. Fore wings pale, fuscous with perpendicular, waved, darker transverse lines. Orbicular yellowish, small, rounded; reniform concolorous, small, with internal streak. A terminal series of black dots, preceded by a waved pale line. Hind wings pellucid white, with a terminal linear shade, soiled on the veins.

Expanse 30 m. m. Oregon, No. 6003; California, No. 3481. Coll. Mr. Hy. Edwards.

Graphiphora pulchella, n. s.

♀. Eyes hairy; head sunken; thorax untufted. Purple brown; terminal space lilac gray; costa shaded with lilac gray. Transverse lines dark, evident, denticulate; t. p. line geminate, forming a prominent series of points followed by gray dots; both lines followed by gray shades. Stigmata concolorous, edged with black and gray; orbicular sub-quadrate; reniform sub-equal, elongate, oval, slightly constricted at centre. Thorax purple brown. Hind wings and abdomen fuscous; beneath the wings are pale with a red flush, common lines and discal dots.

Expanse 33 m. m. No. 2921, California, Mr. Hy. Edwards' Coll. The handsomest species of the genus known to me.

Calymnia calami, n. s.

Antennae brown, palpi whitish, smaller winged and more slender than *orina*. Differs from it in the light yellow of the primaries. The median lines are trapezoidal, more nearly approaching each other at the inferior border, white with a dark shade internally. Reniform white margined, slight constriction externally. Orbicular round, small, with a white annulus; terminal line inconspicuous; fringes concolorous. Beneath of an ochreous shade, much like *orina*. T. p. line evident. Secondaries white, tinged with yellow, lines obsolete. Thorax and body concolorous

with primaries above; legs of the color of the under surface of primaries.

Expanse 30 m. m. Violet label, Mr. G. W. Belfrage, Bosque Co., Texas.

Lithophane Oregonensis, n. s.

Allied to *Georgii*, but paler gray, with the orbicular slightly extended below median vein, in which respect it resembles *laticinerea*. Whitish gray; a fine basal black line. The geminate, acutely dentate median lines apparent on costa. Reniform with red central shade, black ringed, incomplete; cruciform black marks before the subterminal line apparent. Median shade noticeable on costa. Head and thorax whitish gray; black lines on the outside of the tegulae. Hind wings fuscous, with lunule. Body fuscous, with a red tinge. Thorax and legs gray beneath. Front and collar with a black line. Beneath light fuscous, with a light red stain and very distinct lunule on hind wings.

Expanse 45 m. m. Oregon, No. 5600, Coll. Mr. Hy. Edwards.

Lithophane carbonaria, n. s.

♀. A species with naked eyes, flattened abdomen and with untufted thorax, with the sides angulated, but very different in color from any known species, looking distantly like *Macronoctua onusta*. Primaries dull black shading into brownish toward internal margin. Lines geminate, apparent as darker shades. Orbicular spherical, concolorous: reniform medially constricted, showing some powdery pale scales lining the annulus and centrally. Subterminal line preceded by black dots superiorly, pale; fringes brownish. Hind wings smoky fuscous: beneath paler, irrorate, with discal lunule. Fore wings beneath showing costal white dots. Head, thorax and legs blackish.

Expanse 36 m. m. No. 4417, Mr. Edwards' Coll.; California.

Thalpochares elegantula, n. s.

White. Primaries slightly yellowish, with a median brown line edging inwardly a brown fascia with a purple shade, and which encloses the round black edged reniform mark. Traces of the t. p. line beyond this may be made out. Apices and fringe touched with brown. Hind wings and body white; beneath the fore wings are smoky.

Expanse 18 m. m. No. 2579, Nevada, Mr. Hy. Edwards' Coll.

I hardly think December in Buffalo has ever been known to produce moths, yet I have to record the capture, on the 21st of December last, of a specimen of *Orgyia leucostigma*, by Miss Mary Walker, probably the contents of a late fall chrysalid, urged to escape by the unusual warm weather of the season.

ON GENERA AND THE LAW OF PRIORITY.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The writers who are engaged in the work of giving us an account of the different kinds of Butterflies and Moths inhabiting North America, seem to fall into two categories with respect to their ideas of classification. As in other departments of Natural Science, the Entomologists differ principally in their conception of what constitutes a genus. They are either *lumpers*, making their genera very wide, or *splitters*, making their genera restricted and dependent upon less conspicuous details of structure. And the different writers display as many phases of the two ideas, so that, with respect to any one individual, we may not certainly classify him without attention. Feeble *lumpers* may be recognized by their admittance of a few more obvious genera even when these have been proposed by representative *splitters*. Feeble *splitters* may be known by their admission of sub-genera, or sub-generic divisions. Again, the *lumpers* may be divided into *intelligent lumpers*, who, for the most part, may be aware of the minutest differences in structure offered by the objects of their studies, but who fail to consider these differences as worthy of expression in generic nomenclature; and *unintelligent lumpers*, who fail in perception and in knowledge alike. Numerically speaking, the *lumpers* are in the ascendant, perhaps in the proportion that it is easier to appreciate general resemblances rather than minute agreements. As the rule, it is the *lumpers* who attack, but, strange to say, it is not so much the method of the *splitters* that they attack by a display of argument drawn from fact, but the application of zoological rules of nomenclature and the operation of the law of priority in scientific writing. As a rule,

the *splitters* have here the advantage from their more extended reading. With them it was a greater necessity that their more numerous genera should be correctly named, and they have been at pains to adopt from older writers, like Hübner, all the generic names they could legitimately use under the received zoological rules of the British Association. A want of comprehension of these rules which seems almost deliberate, has induced Mr. Strecker to attack the term *Cressonia*, now in use for *juglandis*, one of our Phalaenoid Sphinges, under the plea that it is synonymous with *Polyptichus*, whereas it was *originally* shown that *juglandis* was included with *all* the eyeless Phalaenoid Sphinges known to Hübner, and that, when it was found to differ from *all* of these, a different term was properly proposed for it, leaving *Polyptichus* to be used for one or more of the species included under it in the Verzeichniss. This by way of illustration.

With regard to the attack on the law of priority, or rather, its application by the *splitters*, this much seems reasonable, that, if its application defeats the end of Entomology, which is to give us exact knowledge of our insects, it must be modified or abandoned. To write merely to vindicate an application of any code of rules at the risk of confusing the study for the furtherance of which such rules have their excuse for existing, cannot be defended. If the law of priority cannot be extended so as to include Hübner, without endangering the study of Entomology, it would be advisable to drop Hübner.

The real contest does not seem to us to be about Hübner, although Hübner and his generic names and ideas have afforded the most popular, if not the most vulnerable point of attack to the *lumpers*. It is rather between the sets of ideas which we have described with regard to the value of genera. To illustrate: The N. Am. Phalaenoid Sphinges have been divided among the genera *Smerinthus*, *Paonias*, *Calasymbolus*, *Amorpha* and *Cressonia*. Objections are made against the use of Hübner's terms as here applied. Would it be any advantage to have ignored these and substituted new or different ones? Obviously, not. These terms are then as good as any others, provided they are to stand at all. And now let us look without impatience at these genera. What is the question which at this time is *the* question among naturalists. Is it not rather the question of how all these different species and genera came about, rather than a mere cataloguing of them for convenience sake? And will not, therefore, any system of classification which expresses more clearly the inter-relationship through slight modifications of structure, be the classifi-

cation which thinking men will adopt? Now, in ignoring these slight modifications of structure in the case of the Phalaenoid Sphinges, we should have to lose sight of the fact that at least three of the American genera have no representatives in Europe, that the European *ocellatus* is represented in America by strictly congeneric species; both of these facts, which seem to us of great importance to know, would be obliterated by a lumping of the species indiscriminately under one generic name. In the case of one of these genera, *Cressonia*, it is known that it was incorrectly held by Dr. Clemens to represent the European *populi*, that the correction has been made, that its right to a separate consideration has been made plain. What is to be gained toward the solution of the great question of the development or origin of these species by overturning this work? Are we not able, indeed, to grapple with this question at a better advantage when we know all the facts in the case, than when our classifications are so deceptive as to embrace different kinds of structure under a common generic name? The mental operation by which we recognize "genera," is evidently the same kind as that by which we recognize "species." Both of these are alike abstract conceptions; they have the same basis for existing in our minds and books.

In so far as the new generic ideas seem a development of the old, and in consonance with our increase in knowledge, we may trust to them. It is well also that the *lumpers* have their say and full weight; for undoubtedly extreme cases of splitting have to be corrected, and extreme applications of the rules of priority have to be rejected as leading to no useful results to science, which should be the criteria for all scientific action. And with all these varying counsels we still can be reasonable with each other in our common cause; imputing no evil and overcoming each one his own unreasonableness so far as he is able. An adverse criticism from which there will be no appeal may fall on those of us who do not recognize the current scientific thought, but waste their opportunities in useless controversies, showing no appreciation of the scientific value of Entomology.

Entomology at the Centennial.—The Entomological Society of Ontario has forwarded a very fine collection of Canadian insects to Philadelphia, consisting of eighty-six cases, forty-five of which are Lepidoptera and twenty-seven Coleoptera, the remainder being occupied by the other orders.

CORRESPONDENCE.

ENTOMOLOGICAL NOTES FROM THE COUNTY OF PETERBORO, ONT.

DEAR SIR,—

As no work, or but very little, can be carried on at this season out of doors, in aid of the objects you have in view in the publication of the CANADIAN ENTOMOLOGIST, I forward a few extracts from my note book of last year.

April 5th, 1875. I captured a fully developed specimen of that very troublesome butterfly, *Pieris rapæ*, in my garden, the thermometer having been only 1° above the freezing point on the preceding night, and not having risen beyond 38° during the entire day.

The *Pieris* was not nearly so destructive to my plants in 1875 as it was in the previous year, inasmuch as in the fall of that year I had discovered and destroyed some hundreds of chrysalids that had attached themselves to the inside of the doors and walls of my tool-houses, and beneath my verandah-roof. In 1874 my cauliflowers and cabbages, during my frequent absence from home, were well nigh eaten up by this garden pest, and such as were not actually devoured were rendered unfit for use by the quantity of excrement deposited between the leaves of the plants. A sprinkling of buckwheat flour was suggested as a remedy, but I tried it without effect.

May 16. The mischievous flying and hopping *Haltica striolata* was swarming in my melon-frames. I dusted the plants with soot, which appeared to disagree with their constitution and prevented their effecting any material damage. I have sometimes tried sprinkling the plants with tobacco water, which forces them to retire to the outside of the frame, where they can readily be destroyed before they recover from the effects of the tobacco.

May 24. The first Potato Beetle, *Doryphora decem-lineata*, made its appearance—not on my potato plants, for, since the advent of that interesting "bug," I have preferred purchasing to growing potatoes—but on my egg-plants and tomatoes, both of which plants belong (or rather *belonged*, for the tomato is now *Lycopersicum esculentum*) to the *Solanums*, as does the potato. I have generally found that where potatoes and egg-plants are grown in the same garden, the Colorado beetles attack the

latter with even greater voracity than they do the former. My remedy, as regards the egg-plants, is hand-picking two or three times a day, a remedy where, from the size of the garden, it can be adopted, the most efficacious that can be devised.

June 5. The *Nematus ventricosus* appeared upon the currant bushes. A watering with hellebore and water proved, as usual, an unfailing specific.

June 16. I captured an *Elater occulatus*.

June 19. *Sesia diffinis*.

June 24. *Saturnia io*, ♂, 2¾ inches in expanse.

July 4. The Fireflies, *Lampyris corusca*, first appeared, enhancing, by their glittering, glancing evolutions, the charms of the evening hours.

July 10. I captured a *Saperda tridentata*.

August 17. *Buprestis Virginica*.

August 19. Camping out with a party on one of the granitic islands of our most beautiful and romantic Stony Lake. Saw a large number of those exquisite little beetles, the *Chrysochus auratus*.

August 20. Red Admiral butterfly, *Vanessa atalanta* (Westwood).

August 26. *Arge* tiger-moth.

August 28. *Silpha vespillo* (Samouelle).

August 30. *Buprestis dentipes*.

September 5. I captured in my garden a good specimen of that very lovely moth, *Deiopeia bella*.

September 20. Found a common cricket, *Acheta abbreviata*, with a hair snake, *Gordius*, attached to it. Whenever the unhappy victim moved the snake appeared to lash itself into a perfect fury, twisting itself around the cricket in all directions.

October 20. I found a chrysalis of the Five-spotted Sphinx, *Sphinx quinquemaculatas*, which I now have by me still alive.

On the same day, the thermometer on the preceding night having run down to 32°, I captured a brilliant specimen of *Vanessa progne*.

October 21. Dug up in my garden a quantity of grasshoppers' eggs enclosed in a pellicle of dried varnish.

VINCENT CLEMENTI, B. A.

Peterboro, January 28th, 1876.

The Canadian Entomologist.

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THE RELATIONSHIP OF THE EARLY SPRING BLUES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

The simple fact which Mr. W. H. Edwards published in this journal last May* has thrown great doubt over the relationship of all the American species of Cyaniris. From eggs laid in September, 1874, by *C. Pseudargiolus*, he reared in the following February *C. violacea*. From this fact he is led to conjecture that in W. Virginia, where his experiments were made, *C. neglecta* may prove to be a genetic form of the same species, reducing the entire series in that district to one. He also infers that further north *C. Lucia* and *C. neglecta* are forms of one species, though how this can be reconciled with the previous conjecture he does not explain.

Against the inference concerning *C. Lucia* and *C. neglecta*, Messrs. Saunders and Lintner reasonably urge† that *C. Lucia* is unknown in well worked districts where *C. neglecta* is abundant. This would at first seem to disprove any such relationship between them: but when it is remembered that *C. Pseudargiolus* exists in abundance in California, in districts well explored by resident collectors, while *C. violacea* (raised by Mr. Edwards from *C. Pseudargiolus*) has not yet been found; then we must conclude either that the *Pseudargiolus* of California is a different species from the *Pseudargiolus* of W. Virginia (whereas specimens from the two countries are wonderfully alike), or else that *C. neglecta* may be genetically preceded by *C. Lucia* in one place and not in another.

In writing to Mr. Edwards I also objected, as he remarks in a note appended to his paper, that in Massachusetts *C. neglecta*, *Lucia* and *violacea* all appear in May; but this statement, as Mr. Edwards surmises, is incorrect, and must have been made from memory. To illustrate the subject

* Vol. vii, pp. 81–2.

† This journal, vii, pp.

I append to this paper full extracts from the account of the different species of Cyaniris, as written several years ago for my book on New England Butterflies, omitting only that of *C. Pseudargiolus*, as I had nothing to add to Mr. Edwards' account in the "Butterflies of North America."

These considerations, and the hypothesis presently to be offered, show that observations are needed in many different places upon the succession of the broods of all the forms of Cyaniris. Fruitful results would surely follow from a series of complete observations for a single season in such separated localities as W. Virginia, Philadelphia, the Catskills, Albany, Boston, the White Mts., Quebec, Montreal, London, Ont., Detroit, Chicago, St. Louis, Lawrence, Ks., Denver, Col., and San Francisco—all, excepting Denver and the mountains, places where there are resident collectors. The present article is written for the purpose of drawing attention to this point.

In W. Virginia, three forms of Cyaniris appear: First, one *(violacea)* of medium size, in which the spots on the under surface of the wings are of medium size and distinct, and the marginal markings are cloudy angular lunules; in which some females are wholly brown above, and others blue with a heavy brown border. Second, and later, one *(Pseudargiolus)* of large size, in which the spots on the under surface are scarcely more than dots and very light, and the marginal markings are cloudy angular lines; in which all the females are blue above, but with a dash of white in the middle of the fore wing. And third, occasionally, a form *(neglecta)* almost wholly like the latter, but smaller.

In Albany and London, which, zoologically speaking, are more southerly stations than the vicinity of Boston (or, rather, situations more accessible to southern influences), the second of the forms just mentioned does not seem to have been recognized.* As far as I am aware, the females of the first *(violacea)* are always blue.

In the neighborhood of Boston we have: First, a small species *(Lucia)*, in which the spots on the under surface of the hind wings are very large, usually completely confluent and often suffusing nearly the whole base of the wing, and the marginal markings tend to form a broad band with serrate interior margin; in which the females, always blue, have seldom any trace of pale color on the upper surface of the fore wings.

* Lintner, however, catalo ues it from New York.

Second (later), a form precisely like the *violacea* of W. Virginia, but with the female never brown. Third (still later), a form with faint markings corresponding to the *neglecta* of W. Virginia; occasionally in midsummer large specimens of this are taken, and these I have considered *Pseudargiolus*.

In all these places the earliest forms, or those called *violacea* and *Lucia*, have the disc of the upper surface of the fore wings of the female blue (excepting, of course, the brown females of the southern *violacea*), untinged or scarcely tinged with white; while the later forms always have a whitish blotch or dash on the fore wings of the female.

In California and Oregon three forms occur, but at what seasons I cannot say; two of these altogether correspond to the *Pseudargiolus* and *neglecta* of the East, while the third (*Piasus*) is as large as the former and has much heavier markings beneath, but the females are strongly marked with white on the upper surface of the fore wings.*

With this last exception, the specimens of Cyaniris in any one locality seem to become larger, more lightly marked beneath and to show a stronger tendency to paleness on the upper surface of the female as the season advances. In view of this, and of the known relationship of *C. violacea* and *C. Pseudargiolus* in W. Virginia, may it not be possible that there is but a single species of Cyaniris in N. America? For this, it is necessary to assume some such hypothesis as the following, which is suggested solely in the hope of stimulating investigation and arriving at perfect knowledge: That in W. Virginia the first brood of this single species appears as *violacea* with both brown and blue females; the succeeding broods as *Pseudargiolus*, with occasionally (perhaps in seasons unfavorable for the growth of the larva or its food-plant) a few individuals of smaller size (*neglecta*). That in New York and Ontario, the first brood appears as *violacea* with only blue females; and the succeeding broods as *neglecta* with occasionally a few larger specimens (*Pseudargiolus*): this being the centre of the latitudinal range of the insect, the distinction between the broods would appear less marked than elsewhere. That in New England and further north the first brood appears as *Lucia and violacea*—the earlier individuals of the brood *Lucia*, the later *violacea*, just as the first brood

* A species of Cyaniris exists in Western Texas, but I possess only females. These resemble *C. neglecta* more closely than any other of the known forms, but are much paler throughout. They were taken between the middle of September and the middle of October.

of *Ajax* is made up in W. Virginia of an earlier appearing *Walshii* and a later *Telamonides;* the subsequent broods as in New York. That in the high north there is a single brood—the spring form *Lucia* alone. That in California (until we have further knowledge) the early spring brood is absent and the summer broods are made up of *Pseudargiolus* with occasional smaller (*neglecta*) and occasional more heavily marked (*Piasus*) individuals. On this hypothesis, *Lucia* is a boreal and colline form of *violacea*, and the summer broods of the species are absent in the extreme north, or, further south, consist of larger (*Pseudargiolus*) and smaller (*neglecta*) individuals, according to conditions more or less favorable to growth.

Of course this hypothesis is based principally upon my personal knowledge of the sequence of forms in New England, and may prove altogether wrong. I believe, however, that it is worth considering. If it appear complicated, it need only be said that there is complication somewhere. And furthermore, while Mr. Edwards in W. Virginia raised *violacea* in the spring from progeny of *Pseudargiolus* which went into chrysalis the *autumn* previous, Mr. Abbot in Georgia years ago raised *Pseudargiolus* (or what he called *Argiolus*) in March from caterpillars which went into chrysalis the last of *April* of the preceding year. The spring brood, therefore, is probably made up, in the south at least, of butterflies which existed as caterpillars at various times during the whole of the previous year. This is precisely what Edwards has admirably proved of *Ajax;* and if it be a constant phenomenon in Cyaniris, then it is likely to be equally true at the north, and the probable occurrence of dimorphism in the first brood at the north (*Lucia-violacea*) would be similar to the same phenomenon in *Ajax* at the south (*Walshii-Telamonides*) and the two features may yet be proved to have a logical connection.

It may also be added that it is extremely uncommon for two such closely allied species as *neglecta* and *Lucia*, living in the same district, to differ as much as it has been supposed they do, in the number of their broods, *Lucia* appearing in New England but once, *neglecta* twice a year*; indeed only one instance among New England butterflies occurs to me, and that is somewhat doubtful. I refer to *Limochores Taumas* and *L. Manataaqua*, the former of which is double brooded, and the latter, as far as I know, single brooded; the data, in the latter case, however, are

* The second brood appears to be invariably less abundant than the first.

but scant. Still these are butterflies which do not fly before June, while the species of Cyaniris appear early in the spring and thus have a much better chance to develop a second brood. Should my hypothesis of the Californian Cyaniris be brought against me, as presuming a double instead of a triple brood, as in Eastern America, I would reply that there is a much greater difference between monogeneutism and digenutism than between the latter and trigoneutism. It is a much more common thing for a digoneutic insect to become trigoneutic in a southern station, than for a monogenutic to become digoneutic under those influences. Therefore, knowing that the form *neglecta* appears twice a year, it should be regarded, *a priori*, as probable that *Lucia* is succeeded by another brood (not necessarily resembling it) the same season.

As to the European *C. Argiolus*, it is double brooded, but I do not find reference to any difference between the broods.

In this paper, for readier comparison with what has been previously written, I have used the terms *Pseudargiolus*, etc., as Edwards employs them. It is plain to me, however, that the *Pseudargiolus* of Boisduval and LeConte is the form described by Edwards under the name of *violacea*, and I have so placed it in my revision of the species of this group, recently presented to the Buffalo Society of Natural Sciences.

Appendix; On the Seasons of the Species of Cyaniris in New England.

C. NEGLECTA.—Like the preceding species [i. e., *C. Pseudargiolus*] this insect is double brooded, hybernating in the chrysalis state. The earliest males appear at or shortly before the middle of May, but do not become abundant before the last week in the month; the first females appear about ten days later than the males, but are still rare at the beginning of June, although they disappear toward the end of the month or early in July. The eggs are probably laid in the middle and latter part of June and most of the caterpillars become full grown in the early part of July; how long a time is passed in the chrysalis is unknown, but the earliest butterflies of the second brood appear about the first of July and continue to emerge from the chrysalis until the first of August; they become abundant by the middle of July, although the males are often still greatly in excess in the latter half of the month, and in spite of their great delicacy these insects may still be seen in September. This brood

does not appear to be so abundant as the first; we have no knowledge whatever of its subsequent history; probably the eggs are laid in August and hatch at once, the caterpillars attaining their growth in the latter part of September and transforming to chrysalids before winter.

C. VIOLACEA [after quoting Mr. Edwards' statement of its seasons in W. Virginia, as given in the Butterflies of N. America, the account continues]—In the north, however, it appears and disappears much later, for it makes its advent during the first week in May, both sexes becoming abundant toward the end of the month, and it still remains upon the wing throughout June: one specimen has been taken in Walpole, N. H. (Smith), as late as the 7th of July. Of its further history we know nothing; probably the eggs are laid in June and the caterpillar transforms in July, the chrysalids remaining unchanged until spring.

C. LUCIA.—It is a single brooded insect and the first of our butterflies to appear fresh from the chrysalis in spring. The earliest specimens gladden our eyes about the middle of April, although often delayed a week by inclement weather; the earliest recorded date is that of April 14 (W. Roxbury, Mass.-Faxon). It becomes abundant a week after its advent and continues so throughout the first half of May, when it begins rapidly to decrease and by the end of the month is seldom seen. In elevated and northern localities it is unquestionably later in its appearance and disappearance, since male specimens (rubbed indeed) have been taken in Williamstown, Mass., as late as the middle of June (Scudder), in the White Mts. not uncommonly up to the 17th of the month (Scudder), and occasional specimens even on the 23rd–24th (Sanborn), while in Quebec it is "very abundant at the end of May" (Bowles), and in Southern Labrador was "common from the first of June to the end of July" (Couper). In Alaska, the females taken during the first week in June (Dall) were rubbed, but this may have been due to poor collecting implements. In New England the eggs are laid towards the middle of May; this state probably continues a week, but how soon the caterpillar becomes full grown is unknown; it undoubtedly hybernates in the chrysalis state.

CAPTURES OF NOCTUIDÆ NEAR ORILLIA, IN THE PROVINCE OF ONTARIO, CANADA.

BY GEO. NORMAN, CHERRY HILL, FORRES, SCOTLAND.

During the season of 1875 I collected Noctuæ near Orillia, in the Province of Ontario. The locality where I resided was the Couchiching Hotel, a place of great beauty, situated on a wooded isthmus dividing Lake Couchiching from Lake Simcoe.

From the varied nature of the ground, enormous forest tracts, swamps, etc., I fully expected the locality would have been more productive in insects than my last year's place of sojourn, St. Catharines, which was, comparatively speaking, very poor and with very little timber. In this I was much disappointed, possibly owing more to the bad season than to the locality. The season was an unusually cold one. This, combined with the high and cold winds which prevailed at nights during the whole summer, was very much against sugaring, and certainly rendered it one of the very worst collecting seasons I ever experienced.

I may here mention that Mr. F. Grant, who has resided at Orillia some years, has found *Agrotis fennica* not unfrequent on a species of Spiræa, visiting the flowers. He has also taken *Plusia striatella*, *M. Comstockii*, *Agrotis gilvipennis*, *Adita chionanthi* and other rare Noctuæ.

In sending a list of my captures to the CANADIAN ENTOMOLOGIST, I have deemed it advisable, in order to prevent confusion, to adopt the arrangement and nomenclature of Mr. Grote's lately published "Check List." In spite of the above mentioned drawbacks, it will be seen that the locality has not failed to yield a few species new to science. These have been kindly determined and described by Mr. Grote, of Buffalo, to whom my best thanks are due. The following species may be added to my list of St. Catharines captures: *Agrotis decolor*, *Acr. vinnula*, *H. badistriga*, *P. angulata*, *A. plecta*, *T. v-brunneum*, *A. gladiaria*.

Raphia frater. July 4th; rare at light.
Momophane (*Diphtera*) *Comstockii.* (Mr. Grant).
Diphtera fallax. July 2nd; at sugar; not uncommon.
Apatela (*Acronycta*) *occidentalis.* June 7th; common at rest and sugar.
——— *morula.* July 7th; not uncommon at sugar.

Apatela hasta. June 20th ; rare at sugar.
——— *innotata.* July 11th ; common at sugar.
——— *hastulifera.* July 15th ; rare at sugar.
——— *noctivaga.* June 15th ; common at sugar.
——— *superans.* July 11th ; not uncommon at sugar.
Agrotis sigmoides. June 21st ; bred from larvæ ; afterwards frequent at sugar.
——— *haruspica.* July 15th ; very common at sugar.
——— *phyllophora.* July 22nd ; rare at sugar.
——— *baja.* Jnly 29th ; very common at sugar.
——— *C. nigrum.* June 24th ; bred from larvæ ; very frequent at sugar.
——— *bicarnea.* June 17th ; bred from larvæ ; very abundant at sugar.
——— *herilis.* August 11th ; not unfrequent at light and sugar.
——— *tricosa.* August 18th ; rare at light and sugar.
——— *badicollis.* August 4th ; not rare at rest.
——— *rubifera, n. s.* July 24th ; very common at sugar.
——— *conflua.* August 11th ; rare at sugar.
——— *Normaniana.* August 11th ; common at sugar ; much darker than St. Catharines specimens.
——— *plecta.* July 16th ; not uncommon at sugar.
——— *gularis, n. s.* August 12th ; not uncommon at flowers, sugar and light.
——— *cinereomacula, n. s.* July ; not unfrequent at flowers.
——— *turris, n. s.* August 20th ; not unfrequent at sugar and light.
——— *friabilis, n. s.* August 4th ; rare at sugar.
——— *versipellis, n. s.* June 20th ; not unfrequent at light.
——— *campestris, n. s.* Not uncommon at light and sugar.
——— *tesselata.* July 11th ; very common at sugar and light.
——— *clandestina.* June 27th ; bred from larvæ ; very common at sugar.
——— *alternata.* August 8th ; very common at sugar.
——— *cupida.* August 25th ; very common at sugar.
——— *messoria (Cochrani).* August 2nd ; swarming at sugar and light.
——— *saucia.* July 7th ; exceedingly common at sugar.
——— *suffusa.* August 12th ; very abundant at sugar.
——— *venerabilis.* September 9th ; rare at light.
——— *pressa (Aplecta).* July 5th ; common at rest and sugar.

Agrotis occulta (*Aplecta*) August 16th ; not rare at sugar.
——— *prasina* (*Aplecta herbida*). July 8th ; very common at sugar.
Pachnobia Orilliana, n. s. May 13th ; not unfrequent at palms.
Matuta Catharina. May 10th ; not uncommon at palms and light.
Mamestra vicina. August 4th ; rare at rest.
——— (*Aplecta*) *nimbosa.* July 14th ; not uncommon at sugar.
——— (*Aplecta*) *imbrifera.* Bred from larvae often, and at sugar.
——— *atlantica* = *H. suasa ?* June 21st ; rare at light.
——— *albifusa.* June 7th ; very common at rest.
——— *claviplena.* June 2nd ; common at sugar.
——— *olivacea.* August 6th ; common at rest and sugar.
Hadena arctica. July 9th ; very abundant at light, rest and sugar.
——— *devastatrix.* July 1st ; the most abundant moth at light, rest and sugar.
——— *apamiformis.* August 7th ; rare, one specimen at light.
——— *sputatrix.* July 12th ; exceedingly common at sugar.
——— *dubitans.* July 19th ; rare at sugar.
——— *sectilis.* June 28th ; not uncommon at sugar.
——— *mactata.* August 19th ; very abundant at sugar.
——— *modica.* August 14th ; not uncommon at sugar.
——— *fractilinea.* August 24th ; not uncommon at sugar.
——— *chalcedonia.* June 14th ; not common at sugar.
——— *renigera.* July ; very common at rest and light.
Dipterygia scabriuscula (*Pinastri*). July 1st ; not unfrequent at sugar and rest.
Hyppa xylinoides. June 12th ; very common at sugar and rest.
Actinotia (*Cloantha*) *ramosula.* August ; one specimen at light.
Callopistria mollissima. August 12th ; rare ; one specimen at sugar.
Conservula anodonta. July 21st ; not uncommon at sugar.
Trigonophora periculosa. July 21st ; not rare at sugar.
——— *v-brunneum, n. s.* July 24th ; not rare at sugar.
Euplexia lucipara. June 9th ; frequent at light and sugar.
Brotolomia iris. June 21st ; rare at light.
Nephelodes violans. August 21st ; very frequent at light, rest and sugar.
Helotropha reniformis. August 12th ; very abundant at sugar.
——— *atra, n. s. ?* With the last, but not so frequent.
Hydroecia nictitans. July 17th ; very common at sugar.
——— *sera.* July 15th ; common at sugar.
Arzama obliquata. July 14th ; rare at light.

Heliophila pallens. July 16th ; rare at sugar.
——— *unipuncta.* June 21st ; very common at flowers and sugar.
——— *pseudargyria.* July 15th ; rare at sugar.
Laphigma frugiperda. September 6th ; rare at sugar.
Caradrina miranda. August 9th ; rare at sugar.
——— *multifera.* August 8th ; very abundant at sugar, light and rest.
Pyrophila (*Amphipyra*) *pyramidoides.* August 7th ; very abundant at sugar.
——— *trogopoginis.* August 8th ; common at sugar and rest.
Parastichtis gentilis. July 25th ; rare at sugar.
——— *perbellis.* July 18th ; rare at sugar.
——— *minuscula.* September 9th ; rare at light.
Crocigrapha Normani. May 17th ; not uncommon at palms.
Tæniocampa alia. May 20th ; very rare at palms.
——— *oviduca.* June 9th ; very rare at light.
Orthodes infirma. July 10th ; common at sugar.
——— *cynica.* July 18th ; common at sugar.
Eucirrædia pampina. August 24th ; abundant at sugar.
Orthosia infumata. September 12th ; rare at sugar.
——— *ferruginoides.* August 29th ; very common at sugar.
——— *togata* (*silago*). September 10th ; not common at rest and sugar.
Scoliopteryx libatrix. Very common at sugar all the season.
Litholomia napæa, n. g. et sp. May 11th ; rare at sallows.
Lithophane (*Xylina*) *petulca.* September 10th ; very abundant at sugar.
——— *ferrealis.* September 2nd ; common at sugar.
——— *Bethunei.* September 2nd ; swarming at sugar.
——— *semiusta.* May 18th ; rare at palms. September 9th ; common at sugar.
——— *Georgii, n. s.* September 5th ; not uncommon at sugar.
——— *disposita.* Rare at palms in May ; abundant in Sept. at sugar.
——— *cinerea.* Rare at palms in May ; September 15th, occasionally at sugar.
——— *laticinerea.* September 15th ; rare at sugar.
——— *oriunda.* September 8th ; rare at sugar.
Anytus sculptus. August 21st ; rare at sugar.
——— *capax.* September 14th ; rare at sugar.
Calocampa nupera. May at sallows. September 11th ; common at sugar.
——— *curvimacula.* May at sallows. September 14th ; not uncommon at sugar.

Lithomia germana. September 5th: very abundant at sugar.
Plusia aereoides. August 7th; not common at rest.
—— *purpurigera.* August 1st; at thistle blooms.
—— *bimaculata.* August 28th: rare at rest.
—— *striatella.* (Mr. Grant).
—— *simplex.* June 8th; rare over flowers.
—— *u-aureum.* September 9th; rare at light.
Pyrrhia exprimens. August 2nd; rare over flowers.
Galgula hepara. September 9th; rare at rest.
Eustrotia carneola. June 12th: common at rest and sugar.
———— *nigritula.* July 9th; not unfrequent at sugar.
Drasteria crichto. May 2nd; not common.
Parallelia bistriaria. July 2nd; not unfrequent at sugar.
Catocala relicta. September 10th; saw several at sugar.
——— *unijuga.* August 14th; not common at sugar.
——— *Briseis.* July 21st: common at sugar and rest.
——— *parta.* August 29th; rare at sugar.
——— *ultronia.* Jnly 27th; common at sugar and rest.
——— *concumbens.* August 11th; not common at sugar.
——— *ilia.* August 12th; rare at sugar.
——— *antinympha.* (Mr. Grant).
——— *cerogama.* August 11th; very common at sugar.
——— *præclara.* August 2nd; not unfrequent at sugar.
——— *fratercula.* August 18th; rare at sugar.
——— *gracilis.* August 11th; rare at sugar.
Homoptera calycanthata. May 28th; common at sugar.
Pseudaglossa tubricalis. One of the most abundant at sugar throughout the season.
Epizeuxis Americalis. Exceedingly common at sugar.
Xanclognathe lævigata. Rare in July.
———— *ochreipennis.* Not unfrequent at sugar in July.
Renia plenilinealis. August 24th; not unfrequent at sugar.
Bleptina caradrinalis. Not common at sugar in July.
Bomolocha perangulalis. July; very abundant at sugar.
——— *abalienalis.* July 20th; common at rest and sugar.
——— *Baltimoralis.* Very frequent at sugar.
——— *hijugalis.* June; not unfrequent at sugar.
Hypena subrufalis. August; not unfrequent at sugar.

Hypena evanidalis. August 13th ; rare at sugar.
Platyhypena scabra. Common at sugar.
Bruphos infans. At birch trees in May (Mr. Grant).

NOTES ON CATOCALAS.

BY THE EDITOR.

For several years past we have had in our possession bred specimens of a small species of Catocala near *polygama*, which we have been unable to refer with certainty to that species, and yet in the imago state the differences between the two are so inconspicuous that we have felt a hesitancy in describing the one as distinct from the other. There is, however, what appears to us to be a strongly marked difference between the larvæ of the two species, and chiefly on this ground we have been induced to describe them as distinct. The larvae of both species feed on thorn.

Catocala cratægi, n. s. Larva. Specimens taken by bush beating about the middle of June. Length about one and a half inches, oniscifform. Head flat, medium sized, slightly hairy, grayish, with a few blackish streaks and dots ; bilobed, each lobe tipped with reddish, mixed with white ; these colors margined before and behind with blackish brown, in which are dots of a paler hue ; sides of head pale greenish white, with a faint network of brownish lines.

Body above greenish ash color, with many minute dots of brownish black, some of them forming indistinct and imperfect lateral streaks ; dorsal line very slightly paler than general color. Second and terminal segments with a number of small whitish dots, each emitting a single hair. On each side of the dorsal line is a row of small tubercles, those on third segment whitish tipped with black, on fourth reddish tipped with dull white ; on the remaining segments they are a little larger and decidedly red tipped with whitish. Between each of these, and running in the same direction, is a small whitish dot or minute tubercle ; each and all of these tubercles emit a single brownish hair. The upper portion of the ninth segment is raised, *and on its centre there arises a thick, fleshy horn*

about one-tenth of an inch long, slightly curved backwards, of a dull dark reddish color, thickly dotted with black about the base. The usual dark patch on ninth and tenth segments is wanting, excepting close to under surface, where it is faintly visible. Twelfth segment scarcely raised, with no black streak behind, but having a faint line formed by a row of black dots extending obliquely down the sides towards the front. Terminal segment flattened: lateral fringe of a decided rosy pink hue: spiracles whitish encircled with black.

Under surface whitish green, with a tinge of blue; a central row of brownish black spots larger and deeper in color on seventh and eighth segments, decidedly paler on second, third and fourth, and of a reddish brown on segments from ninth to thirteenth inclusive. Feet pale greenish, faintly marked with brown: prolegs bluish green, hinder three pairs streaked and dotted with black.

Occasionally specimens not full grown have been met with of a darker shade, arising from their being more thickly dotted with black; in these the tubercles have been less decidedly red, while the fleshy horn approached the general color, but was thickly covered with blackish dots.

The moths produced from this larva very much resemble *polygama*, but are smaller. The brown filling of the subterminal space is obsolete or very pale: the transverse posterior line has the lower tooth very small, while the line itself is narrow: in *polygama* the teeth are sub-equal; the sub-costal angulation of the line is also less pronounced and the subreniform is connected with and very near the transverse posterior line. In 25 specimens of *polygama* the subreniform is connected with the transverse posterior line only in a single specimen. The transverse posterior line between the lower discal tooth and vein 2, where it joins the sub-reniform, is more directly oblique and even: in *polygama* this line, though sometimes uneven, seems to form a regular curve. The transverse anterior line appears to be more regularly arcuate. The hind wings and under surface are almost identical with *polygama*. From both sexes carefully examined we are unable to give any further points of difference.

We would here remark that in six additional specimens of *polygama* the lower tooth of the t. p. line is smaller than the upper. Possibly none of the points of difference urged are in themselves invariable, nor perhaps such as would suggest the separation of the species; at the same time, it is possible that some essential differences may have escaped our

observation. The differences in the larva, to be presently referred to, will, we think, excuse us for regarding the species, at least for the present, as distinct. All the specimens referred to, including an example of the larva preserved in alcohol, have been submitted to Mr. Grote, who thinks the species are probably distinct.

Larva of *Catocala polygama* found feeding on thorn about the middle of June. Length about one and three-quarter inches. Head flat, sprinkled with fine brownish hairs; bilobed, each lobe tipped with whitish; color ashy grey with a wide black band above extending obliquely down the sides, in which are several dull faint reddish streaks.

Body above greenish grey, dotted with very minute blackish dots; on the anterior portion of second and third segments there are a few whitish dots, each emitting a single hair: a broken dorsal stripe of a paler hue imperfectly margined with black, the stripe becoming whiter on hinder portion of fifth, sixth, seventh, eighth and tenth segments. On fifth and sixth segments are two whitish patches similar in form, almost pointed anteriorly, posteriorly enlarging with the hinder edge concave, thus giving the widened portion a bilobed appearance; posterior portion of fifth segment rather darker than general color, with a slight purplish tint; hinder portion of ninth segment *slightly* raised and of a deeper color, the dark patch covering the anterior portion of tenth segment and extending down the sides close to under surface. Posterior portion of twelfth segment slightly raised and margined behind with black, the same color extending obliquely down the sides towards the front. On each segment there is a small tubercle on each side the dorsal line, of a greyish hue, but so small as to be scarcely visible, excepting those on twelfth segment, which are somewhat larger. Terminal segment flattened and spreading, with a few whitish dots on its hinder portion and two reddish brown tubercles on anterior portion. Lateral fringe close to under surface of a delicate pinkish tint; spiracles blackish.

Under surface whitish green with a tinge of blue, with a central row of blackish spots larger and deeper in color along the middle, smaller and paler towards each end. Feet and prolegs greenish, dotted and streaked with brown or brownish black.

Var. A.—Rather paler in color, dark patch on ninth and tenth segments and whitish patches on fifth and sixth segments less prominent, dark patch on fifth segment almost wanting; small tubercles on each side the dorsal line more apparent: spiracles brownish, faintly edged with white.

Var. B.—General color with a stronger tinge of green, and an indistinct pale irregular stripe on each side (this character is also faintly visible in specimens of Var. A); whitish patches on fifth and sixth segments faint; small tubercles same as in Var. A.

Var. C.—Much paler in color than either of the other varieties, with the body of a decidely greenish tint. Dorsal stripe very faint; light patches on fifth and sixth segments scarcely visible; small tubercles on each side the dorsal line blackish or brownish black, and in consequence of the paleness of general color, appear more prominent; dark patch on fifth segment wanting, that on ninth and tenth segments present, but rather paler than in the other varieties; lateral fringe very pale, with a slight pinkish tint. Spiracles dark, faintly encircled with whitish.

In all these varieties the markings on the head are constant in the two species; the peculiar shaped patches on fifth and sixth segments in *polygama* are constant, but vary in distinctness. The small dorsal tubercles in *crataegi* are always more or less red, but the most prominent and valuable point of distinction is to be found on the ninth segment, which in *polygama* is never more than a slightly raised fold, while in *crataegi* it is invariably a distinct thick fleshy horn, about uniform in size. This one character will enable any collector instantly to separate the larvæ of the two species.

NOTES ON LEPIDOPTERA.

BY C. P. WHITNEY, MILFORD, N. H.

Thyreus Abbottii. Larva.

The larva of *Thyreus Abbottii* possesses a peculiar interest to the Entomologist, as it is the only species of which the sex is supposed to be indicated by the coloration. Frequent reference to this is found in works of different authors, and nowhere have I seen any doubt expressed about the validity of the distinguishing markings between ♂ and ♀ (*vide* Harris' Ent. Correspondence, p. 284; N. Y. State Museum Report, p. 114; Can. Entomologist, 1874, p. 146).

In the season of 1873 I received from a friend eight of the supposed ♀ larvæ fully grown, taken on Sweetwater Grape. As I previously had reason to doubt the correctness of the theory that all with the uniform brown mottling were of one sex, I watched with considerable interest the next year's development.

May 16th, there appeared in the breeding box one ♂, one ♀ imagines; the 18th, another ♂ emerged, and the next day another ♀.

Being absent for some time afterward, I made no note of the remainder of the brood, nor do I now recollect if any more were disclosed.

None of these larvæ had any appearance of the green markings, nor have I ever seen any captured here which had, but have seen such in Massachusetts and New Jersey.

Lerema Loammi, nov. sp.

♂. Expands 1⅛ in. Wings above dark glossy brown, darker basally. Ciliæ light brown, with a blackish line at extreme base. Primaries with a subcostal transverse row of quadrate whitish spots, situate one in each of the three terminal subcostal interspaces near its base; the upper one one-half its length nearer apex. A larger sub-quadrate spot crossing second median interspace at one-third the distance from its base. An obsolescent transverse line in lower median interspace, equidistant between its base and spot in second interspace. A narrow black sexual bar broken by first median nervule: the upper portion straight, commencing at second divarication of median nervure and crossing the interspace to first median nervule near its source. The lower portion of the bar commences below the nervule about its own width removed outwardly, is strongly concave within, and reaches submedian nervure about two-fifths its distance from base. Secondaries immaculate.

Beneath dark chestnut brown. Apex of primaries and border of secondaries with a bloom of pearly scales. Primaries with upper markings repeated and two minute dots in subcosto-median interspace, resting one on each nervule: one in first median interspace and a transverse line in third. These five (including one in second interspace repeated above) are in a line from apex to middle of internal margin.

Secondaries with a curved sub-basal row of three small irregular white spots. The first is in the costo-subcostal interspace one-fourth the distance from its base; the second in the subcosto-median interspace, and

the third on the submedian nervure. A subterminal sinuate row; the first double, situate in the costo-subcostal interspace midway between its other spot and its extremity. A black streak running from this spot sharply outward to next spot in subcosto-median interspace, which is followed in the succeeding interspaces by five more small transverse spots. All the spots of secondaries with a black border.

♀. Expands 1 ½ in. General coloration a little lighter than in the male. Primaries above with two spots at extremity of disc. An irregular transverse band commencing with three subcostal spots, the upper one not removed outwardly as in the male; the fourth twice its own width nearer margin; the fifth in a line with first three; the sixth twice its width nearer base; the seventh largest, removed its width internally; the eighth double or with upper half obsolete. Lower surface of primaries with upper markings repeated. Secondaries with basal row inconstant. First three spots of subterminal row running toward outward margin; the others running at a right angle from third, toward inner margin. In one ♀ the subterminal row of secondaries is indicated above by a few lighter scales. 1 ♂, 3 ♀, Jacksonville, Fla. March 22nd, 23rd, 1875.

ON PLATYSAMIA COLUMBIA Smith.

BY F. B. CAULFEILD, MONTREAL, P. Q.

In No. 4, Vol. ii, of the "Bulletin of the Buffalo Society of Natural Sciences," Dr. H. A. Hagen gives an interesting paper on this moth and its parasites.

After a brief review of the previous literature of the species, Dr. Hagen says: "If *columbia* should happen not to be a distinct species, it must be either a variety of some other species or a hybrid of two species." As regards its being a variety of *cecropia*, Dr. Hagen says that he has examined large numbers of *cecropia*, but never saw a variety agreeing with *columbia;* one small and dark colored male he indeed at first thought was an intermediate form, but on comparing it carefully he found it to be *cecropia*, though a somewhat remarkable variety; he therefore comes to the conclusion that *columbia* is not a variety of *cecropia*.

My own experience exactly corresponds with this. I have seen many specimens of *cecropia*, both large and small, light and dark, but nothing that would form a connecting link between the two insects. As regards the second eventuality, a hybrid form, Dr. Hagen says that he "believes it possible that *columbia* may be a hybrid, perhaps of *cecropia* and *prometheа*: in favor of its being a hybrid would be the circumstance that such a large species should occur so rarely, while the large number of Lepidopterologists eager to secure this treasure operates against the idea of its being overlooked."

Columbia certainly is very rare, as yet having only been recorded from three localities, Norway, Maine, and Quebec and Montreal, Canada. However, between Maine and Quebec, and Quebec and Montreal, are doubtless many places as yet but little known to Entomologists, where *columbia* may at some future day be found in comparative abundance.

Dr. Hagen says: "The conjecture that *columbia* is a hybrid would not be worth mentioning, if there did not exist similar cases recorded by the most prominent authorities. Of course I speak only of cases of hybrids as imagos or caterpillars, from which imagos, when bred, have been collected in the open fields. The facts just at hand (I have no doubt that more are published) record caterpillars of hybrids of *Saturnia carpini* and *spini*, found in Austria, according to Lederer; caterpillars of *Sphinx epilobii*, a hybrid of *S. vespertilio* and *euphorbiae*, being found in France, according to Rambur; in the same country are found also caterpillars of *Sph. vespertilioides*, the hybrid of *S. vespertilio* and *S. hippophaes*, according to Boisduval and Lederer. The imagos and caterpillars of *Sph. phileuphorbia*, hybrids of *Sph. euphorbia* and *galii*, have been found near Berlin in several specimens. Hybrids of *Zygaena trifolii* and *filipendulae* were found in the imago state in England; hybrids of *Colias edusa* and *hyale*, of *Lycæna adonis* and *alexis*, of *Hipparchia arcania* and *hero*, of *Cœnonympha pamphilus* and *iphis*, of *Vanessa urticæ* and *atalanta*, are recorded from different countries."

This is an interesting list of hybrids taken at large, and proves (if proof were wanting) that hybrids occur amongst the Lepidoptera, but as there is only one *Saturnian* mentioned, I do not think it gives much support to Dr. Hagen's conjecture regarding *columbia*. I am of opinion that hybrids found at large must have arisen from chance encounters of the species that produced them, and therefore are to be looked for in families whose habits would be likely to bring them together, and in fact, with one exception, such is the case with the hybrids mentioned by Dr.

Hagen. The Sphinges proper (there is no *Smerinthus* mentioned) all frequent flowers. My friend, Mr. Hibbins, has taken in this locality (Montreal), at a cluster of lilac bushes, during one evening's twilight, examples of *Deilephila chamænerii*, *Sphinx chersis*, *Sph. drupiferarum* and *Sph. kalmia*. Mr. J. A Lintner, speaking of the Noctuid *Cucullia intermedia*, says he has observed them at lilac blossoms associated with *Deilephila chamænerii*, *Amphion nessus*, *Thyreus Abbottii* and *Sesia thysbe*. Many other instances might be cited, but the fact is well known to all collectors that numbers of the Sphingidæ are constantly meeting while in search of food. This is also the case with the Zyganians, at least with the species mentioned by Dr. Hagen, as they not only frequent flowers but actually sleep on them. Edward Newman, in his Natural History of British Moths, says of *Zygæna minos*: "In some favored spots every daisy will have its tenant, and as many as eight or nine are sometimes seen clustered on a single flower of the dandelion." Of course the same rule applies to the Diurnals: I have myself taken in one afternoon, between the hours of two and four, at a patch of wild asters, examples of *Grapta comma* (both forms), *G. faunus*, *G. progne*, *Pyrameis cardui*, *P. huntera* and *P. atalanta*, and once took *faunus*, *comma* and *cardui* with one sweep of the net, so closely were they associated.

With the Saturnidæ, however, the direct opposite is the case: not taking food, they do not visit flowers, being solely occupied in providing for the continuance of their species, the female waiting for the attendance of the male.

Mr. L. Trouvelot, who has bred thousands of *Telea polyphemus*, gives a very full account of its habits in Vol. 1, *American Naturalist*. Speaking of the freshly emerged insect, he says: "The moth remains quiet all day and sometimes all night, and the following day, if the night be cold; but if it be warm and pleasant, at dusk, or about eight o'clock, a trembling of the wings is observed, and then it takes its flight, making three or four circles in the air. The male flies only a few minutes, and then rests for two or three hours in the same place. The female continues to fly about the bushes, and though a virgin, she lays eggs, which are, however, of no use for the propagation of the species; she continues doing so for two or three hours, and then rests all night attached to some plant, probably waiting for her mate. Soon after the female has laid these useless eggs the males become very active and fly in search of the female, whom they soon discover, especially if there is a slight breeze and the air is loaded with vapors."

If other proof were wanting, this, I think, shows pretty clearly that the female moth gives forth some attraction by which her presence is made known to the male, and I think there must be something peculiar to the female of each species which affects the males of that species only, and by which they are directed to their proper mate, otherwise all would be confusion and there would be no such thing as distinction of species.

Sembling is a method of taking the males of Bombycidæ known and practised by most Entomologists. Are there any instances on record of the female of one species having attracted the male of another?

In the CANADIAN ENTOMOLOGIST, vol. iv, p. 138, Mr. R. V. Rogers, of Kingston, Ont., states that a young female *cecropia* was confined in a box and exposed on a verandah. The first night five male *cecropias* were taken, on the second ten and on the third eight, while in the morning the remains of five others were found, which he supposed had been killed by cats. He also informs us that several specimens of *Telea polyphemus* were taken in the same manner. In the CAN. ENT., vol. v, p. 139, the Rev. C. J. S. Bethune states that on the 19th of June, 1873, he exposed a young female *cecropia* for several nights without success, the evenings being cool. On the 28th, the evening being warm and misty, six male *cecropias* were taken, and as the female had been so long in confinement the experiment was discontinued. Mr. Bethune also tells us that he tried the experiment with a female *promethea*, but as the cocoon had been brought from a distance, no males were attracted.

Dr. Hagen says: "There is perhaps another circumstance in favor of my conjecture. The hybrids of *Tetreao cerogallus* and *tetrix*, known as *Tetreao intermedia*, occur notoriously always when by excessive hunting the males of the first are killed in such a number that the females are obliged to recur to the males of the other species. Now it is not improbable that in times when some species of *Attacus* are extensively damaged by parasites, the interbreeding would be much facilitated."

(To be Continued.)

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NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part II.

BY W. H. EDWARDS.

In 1806, Hübner, as we have seen, printed for his own use and in order that it might be submitted to certain competent persons, to be examined and judged of, the sketch of a plan for the arrangement of the Lepidoptera, called the Tentamen, &c.; and this sketch "was afterwards enlarged and published as the Verzeichniss bekannter Schmetterlinge," as stated by Geyer, Thon's Archiv., vol. 1, p. 28, 1827. What the Tentamen is I have shown in a previous paper, CAN. ENT, vol. viii, Feb'y No., and have given reasons for denying its authority in nomenclature. I will now proceed to show the character of the Verzeichniss and to examine its claims in the same direction.

The Verzeichniss bekannter Schmetterlinge, a Catalogue of Known Butterflies, by Jacob Hübner, Augsburgh, 1816, pp. 431, follows the general plan of the Tentamen. The Lepidoptera are divided into several *Phalanxes*, of which the first is called *Papiliones*, the second *Sphinges*, the third *Bombyces*, &c.

The *Papiliones* are divided into two *Tribes*, called *nymphales* and *gentiles*.

The *nymphales* into 9 *Stirps*, the *gentiles* into 6, and each *Stirps* into many *families*, so that in all there are 62 *families* among the Butterflies; and each *family* is divided into small batches called *coitus* and altogether there are 309 *coitus* of Butterflies.

The *Stirps* are briefly and unevenly defined by characters drawn from the mouth, the "snout" (proboscis), the "ears" (antennæ), the body and wings, and partly from the colors of the wings.

The 1st Stirps of the *nymphales*, called Nereides, is thus defined: "Antennæ thin, but thickened like a club at the end, fore wings narrow

and long, hind wings broad and long, fore legs pretty long, the legs and feet beset with a pair of light spines at the end of the feet; the thighs pretty spiny; the abdomen very thin, but thickened towards the end." This Stirps embraces what modern authors call the Heliconidæ, and others.

The 2nd Stirps, Limnades, thus: "Antennæ pretty long and knobbed; both wings broad and pretty long; the fore legs short, almost smooth, the legs and feet at their ends beset with a pair of slight spines; the thighs rough, the claws long and almost straight; the abdomen long and thicker towards the end." Embraces the Danaidæ and others.

The remaining Stirps of the *nymphales* are more briefly defined. The 3rd, Napaeæ, thus: "The antennæ long, the fore legs pretty hairy upon the langern (a word to be found in no dictionary), and the abdomen short." Partly covering the Lemoniadæ of modern authors.

The 4th Stirps, Lemoniades, thus: "The wings tolerably common-formed (fast gemeinformig). the abdomen moderately stout and long." Comprises in part Lemoniadæ, Acreidæ, Nymphalidæ (Melitaea).

The 5th Stirps, Dryades, thus: "The antennæ very short knobbed. The wings spotted above with black on an ochre-yellow ground, below pale and marbled." Embraces one section of the Melitaeas, viz., Phyciodes and the Argynnidæ.

The 6th Stirps, Hamadryades, thus: "The wings angular, the lower ones having a sheath in which the body rests." Comprises Vanessidae, Elymniadæ, &c.

The 7th Stirps, Najades, thus: "Antennæ tolerably club-shaped; the wings above dusky, below bright colored, every where spot banded." Limenitis, Ageronia and others of the Nymphalidæ.

The 8th Stirps, Potamides, thus: "Body pretty thick, antennæ club-shaped, the wings strong and considerable." Mainly the Morphidae.

The 9th Stirps, Oreades, thus: "The palpi pretty roughly haired; the antennae delicately bent down at the end and club-shaped; the wings with eye like spots, white pupilled; the legs very weak." Embraces the Satyridae and others.

Of the *gentiles*, the 1st Stirps, Agrodiaeti, is thus defined: "The palpi naked at the ends; the cheeks white margined; the antennae tolerably short, long-knobbed; the legs, especially the fore legs, short." Includes the Lycaenidae.

The 2nd Stirps, Archontes, thus: "The palpi entirely hairy; the antennae clubbed, bent; the wings large; the fore legs much like the others, but spineless and the abdomen free." Comprises the Papilios and Parnassians.

The 3rd Stirps, Andropoda, thus: "All the members pretty badly shaped (ziemlich schlechtformig), the wings pale colored and black." Part of the Pieridae.

The 4th Stirps, Hypati, thus: "Palpi large, directed forward, the antennae club-shaped, the wings angled and jagged." The Libytheidae.

The 5th Stirps, Telchinae, includes heterocerous moths, and I omit it.

The 6th Stirps, Astyci, thus: "The forehead broad, the palpi thickly haired; short-snouted; the antennae beset with a little lock on their knoblets, hooked at the end; the wings pretty broad, moderately large." The Hesperidae.*

Now it strikes me that nothing more is needed than to give these definitions in full to show that they are almost if not wholly worthless. If in the 1st and 2nd Stirps of the *nymphales*, and the 2nd and 6th of the *gentiles*, there is a somewhat full definition, embracing the antennæ, palpi, legs and shape of the wings, in the remainder there is a singular indefiniteness and hesitancy. In some the wings are not mentioned at all (Napaeae, Agrodiaeti), in others the members are not (Hamadryades, Lemoniades), in others still the antennæ alone are coupled with the

* NOTE.—The language used by Hubner throughout this volume is uncouth and that of an unlettered man, a condition not at all incompatible with skill in delineating and coloring. Consequently, while his plates are models of excellence, his text is boorish. To him, fore wings are pinions, schwingen; hind wings sinkers, senken; the fore legs arms, aerme; the antennæ ears, ohren; the proboscis a two snouted nose, zweischnaubigen nase, &c. One of the coitus of the Astyci is thus characterized: "The wings spotted with white like a sausage," which is Hubnerian for mottled. Dr. Hagen, to whom I applied for light respecting certain words, writes thus: "Hubner was illiterate. His language cannot be called in any sense plain German. He invented a number of words for things and parts for which words existed long ago in German, and were used and adopted fifty or even a hundred years before Hubner. Apparently he had no knowledge of these words or of the works in which they were used. The consequence is that neither science nor even any popular writer has adopted Hubner's words. They are known to nobody, and for some of them the sense can only be guessed. You will find them in no German dictionary. They are simply self-made barbarisms." Geyer, Thon's Archiv., 1827, in his notice of Hubner and his works, calls his language "illiterate (schwunglose sprache), greatly marred by self-made words."

coloration, not shape, of the wings, and in three especially (Dryades, Najades and Andropoda), the coloration seems to be the essential part of the definition.

Who can possibly know from the definition what is embraced in Napaeae, or in Dryades, or Hamadryades, or Potamides, or Najades, or Andropoda! or in Lemoniades, "the wings tolerably common formed, the abdomen stout and long." What idea does that language convey? Andropoda, "all the members pretty badly shaped," applied to the beautiful Coliades and Teriades! It is the merest rubbish and does not deserve one moment's toleration. Moreover, these divisions accord with no modern system whatever. All through the Verzeichniss, we find that the members of distinct Stirps are ranged by Kirby (whose General Catalogue, 1871, is the latest work of classification of the Rhopalocera, and the one which for convenience I shall mainly use for comparison) in the same sub-family and even the same genus, while, on the other hand, the Hübnerian Stirps, families and coitus dissolve into distinct and unrelated sub-families and genera in Kirby. For example, Melitaea (species Phaeton, Cinxia, &c.) stands in Hübner among the Lemoniades, whose wings are "tolerably common formed," but Phyciodes (species Tharos, &c.), which is closely allied to Melitaea, and has by nearly all authors been considered as but a group under that genus, is put in another Stirps, Najades, where the wings must be intolerably common formed, or tolerably uncommon formed, I do not know which, by the side of the Argynnides. The Vannessidæ go in still another Stirps, and Limenitis in a fourth, and all these and others stand in Kirby in the single sub-family Nymphalinæ. So far as appears, Hübner regarded the barriers which separate these Stirps as substantial as those between any of the series—the Papilios (Archontes) from the Pierides (Andropoda), for instance. As to the species brought within the several Stirps, every lepidopterist knows that a very large proportion of the Butterflies naturally fall into groups so distinct that the veriest tyro in collecting can scarcely make a blunder in assorting his specimens. And what the tyro sees Hübner could not well help seeing, but the moment there was doubt he was completely at fault, and as a consequence several of his Stirps have no foundation in nature and his definitions of them from necessity are as vague and misty as are those of his families and coitus.

The family divisions are made up almost wholly from coloration, and a large part of the names chosen for them are simply puerile, as voracia, fugacia, sapientes, adolescentes, armati, festivæ, etc. And in assorting

the species all the ring-streaked go in one family, all the speckled in another. Thus 1st Stirps, Nereides, 1st family, Vitriæ, "both wings centrally transparent;" 2nd family, Fulvæ, "the wings rust-yellow, spotted with black and sulphur yellow." And as might be expected, both the families and the coitus under them being assorted by mere coloration, with the Stirps characters so insignificant, the results are often surprising. Thus Stirps Limnades, 2nd family Ferrugineæ, "all wings black margined and white dotted," contains species of Danaidae, our D. Archippus (called Anosia Menippa) being one. But the same definition applies equally well to our Limenitis Disippus (called by Hübner Anosia Archippus), and here of course it is among the Danaidae, though its natural allies are in a remote Stirps, the Najades. But the Najades are defined as "dusky above, bright colored below, every where spot-banded," and Disippus under this sort of classification has no place there. As to the characters derived from the members, they form no obstacle at all to the shifting of a species from one Stirps to another. Nereides has the antennæ "thickened like a club at the end"; Najades has them "tolerably club shaped." And so Disippus may range under either Stirps with this limp style of characterization. Another of these Anosians is Misippus Linn., put by Kirby in Hypolimnas Hüb., among the Nymphalinae near Limenitis, and Hypolimnas is also one of the coitus of Najades, defined "the fore wings white spotted, the hind pale banded"! Such instances occur repeatedly, as will hereafter appear, and that not merely between the Stirps of the same Tribe even. Nor need it be deemed strange that in many cases Heterocerous Moths overstep the Phalanx and find their places among the Butterflies.

The value of the family names is so uncertain that authors who reverence the Stirps and coitus names have in a great degree, and, in fact, except in two or three instances, altogether ignored them. And yet if Mr. Scudder's Canon 1 were to have the force of law, each of these 62 family names would have to have place made for it, and be a permanent addition to the nomenclature.

All these divisions, Stirps, families and coitus, are built on the same plan, and are subject to like defects. The family is a magnified coitus, and the Stirps bears the same relation to the family. Some of each may have their equivalents in modern classification, but it is accidental, and the greater part have none. Even were the Stirps homogenous, they could not run with modern families or sub-families. They are both too great and too small. Nor could the families, on same condition, run with

modern sub-families or with genera. They are of less value than the one and either greater or less than the other. So the coitus are also both greater and less than genera; often they are plainly nothing but groups or sub-genera, but as often they embrace a heterogenous collection to which no appellation can be given. They are constructed in defiance of any generic principle, whether it be community of descent or structural resemblance. They are precisely what the name *coitus* indicates, an assemblage, a batch, a lot of things brought together, and in this case the tie is not relationship, but a superficial resemblance in which relationship has no part, and by which all natural grouping is violated, and members of distinct genera, of distinct sub-families and families are brought together because they happen to be red or yellow or blue. Hübner struck out a new path for himself, and instead of adopting the systems sanctioned by the usage of his day, or the characters on which such systems were based, he fixed upon the single item of coloration as the unit of his arrangement. This runs from coitus to Stirps and vitiates the whole. As I have said elsewhere, it is exactly as a child would sort his alleys and taws, or as if, according to the illustration of Dr. Boisduval, applied to this very book, a botanist should found his classification upon the colors of the flowers, or the marbling or pinking of the leaves. Or it is as if a zoologist were to sort the mammals by coloration, and put in one genus a black cat, black fox, black wolf, black bear, in another a gray cat, gray fox, gray wolf and a badger; or as if an ornithologist would couple a blue jay and a blue crane, a gold finch and a yellow parrot. It is impossible, therefore, that these coitus can be ranged with genera. They are something essentially different, crude creations of an unscientific mind,* and any attempt to utilize them is like forcing curved lines to lie parallel with straight.

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*What good result was possible when such an author attempted to classify all the species of the several divisions of the great order Lepidoptera, never having seen more than a small fraction of the insects themselves and knowing nothing of the remainder except through loose descriptions and from plates like those of Herbst and Esper and Cramer, in which the superficies only is represented and that coarsely and with no heed to exactness. Many of the figures on these plates cannot even now be identified, and are believed to represent insects which have no existence in nature, perhaps manufactured articles sold to confiding collectors by cunning dealers. Treitschke intimates that the dealers palmed on the author of the Verzeichniss varieties for species, and common exotics as rare indigenous. Hubner's contemporaries understood his capabilities and were fully equal to judging correctly his system, and accordingly the Verzeichniss was quietly ignored, and except through his plates, this author exercised no influence on that generation.

The sooner and more completely this difference between a coitus and a genus is recognised, the better for the nomenclature of the lepidoptera. *And coitus not being genera, and having no equivalent in the nomenclature of the science, the laws regulating the standing of genera have no application to the coitus whatever.*

In the Butterflies of the Verzeichniss are 309 coitus, out of which Mr. Scudder in the Hist. Sketch has "reinstated" 283, as good and proper names of genera, entitled by what he terms "the inexorable laws of priority" to place, whether there be room for them at the feast or not.*

We have seen how Stirps are defined and families. Let us look at the coitus. Beginning at the 1st Stirps, Nereides, 1st family.

1st coitus, Hymenitis. Fore wings half-banded.
2nd " Ithomia. " " once "
3rd " Oleria. " " twice "
4th " Thyridia. Both wings banded.

2nd family, 2nd coitus, Dismorphia. "fore wings small, hind wings large, particolored." And being of that shape and particolored, the species under this coitus, which really are Pierids, and whose natural allies are in the Stirps Andropoda, in the other Tribe *gentiles*, must rank with the Heliconidæ, ten Stirps away. And why? *Because a Pieris as one of the Andropoda has no business to be particolored, that Stirps permitting only those species which are pale colored and black!*

Take Archontes (Papilios), 1st family, 2nd coitus Jasonidae, "hind wings tolerably long and tolerably short-tailed."

3rd coitus, Euphœades. "both wings tolerably broad, brown colored and yellow-spotted." Now one of these definitions is in no way incompatible with the other. Though the wings of Jasonides may be tolerably long, that does not hinder them from being tolerably broad also, and though Euphœades is brown-colored, for aught that appears, Jasonides

* The laws of priority are not inexorable, and such laws anywhere lead only to absurdity and injustice. The author of the Hist. Sketch nowhere hesitates to decide what names of genera are entitled to credit and what are not, and rejects such as he pleases with no regard to the "inexorable" laws. In the Rules of the Brit. Ass'n, the 11th Rule says, "a name may be changed when it implies a false proposition," &c., the systematist of course being judge. And in the notes on this, Prof. Verrill says, "it wou'd be well to exc'ude all names that refer to abnormal structures," &c. Usage condemns profane and blackguard names. The laws of priority, like all human laws, are to be applied with a few grains of common sense; that is all.

may be brown also. Under the former of these stands our Papilio Turnus, and under the latter the black female of same, or Glaucus. Not a particle of difference between a yellow female Turnus and this black Glaucus, except in the one item of color. But to suit the Hübnerian system the two must lie in distinct coitus ! No better illustration of the nature and value of a coitus could be brought forward. It is black cat, black fox, versus gray cat, gray fox. *Are these two coitus genera or sub-genera, or are they groups ! They are neither, but something radically different, and which has no equivalent in modern systems and cannot be expressed.* I happen to have an example of female Turnus, called an hermaphrodite, one side of the wings and body of which is yellow, the other black, and which therefore belongs equally to two coitus ! The yellow half is Jasonides, the black Euphœades. Does my example therefore belong to two genera !

Mr. A. R. Wallace, President of the Entomological Society, London, in his Anniversary Address of 22nd Jan'y, 1872, Trans. Ent. Soc., uses this language : "We find Hübner's condemnation in almost every page of Kirby, in the utter want of agreement between his groups and modern genera. The modern restricted genus Heliconius contains species belonging to seven Hübnerian genera" (coitus), etc. . . . . while in other cases the species comprising Hübner's groups are divided amongst several quite unrelated genera."

An impression prevails in some quarters that, although the coitus are often composed of heterogeneous materials, yet there are many exceptions, and in such cases, while the former should be rejected, the latter might properly be regarded as natural groups, and accepted as true genera, their names taking precedence accordingly. Mr. Kirby, in his paper on the Necessity of a Reform in the Generic Nomenclature of the Diurnal Lepidoptera, so speaks : "As Hübner relied almost exclusively on *facies*, his genera are both too numerous and too heterogeneous. His genera are usually treated as manuscript" (that is, as entitled to no authority on account of some intrinsic defect, as want of suitable definition, for example), "but unjustly as I now think, though I formerly expressed a different opinion ; for on closely examining the work, *many of his genera will be found to be natural.*" And Dr. A. Speyer, in his paper on Eur.-Amer. Verwandtschaften, Stett. Ent. Zeit., 1875, says : *Only those of Hübner's coitus are to be regarded as scientifically established which are either sufficiently characterized, or in which the satisfactory characterization is at least replaced by the fact that the species of the special genus*

are all brought together under the same generic name without heterogeneous intermixture."

To determine whether homogeneous groups were the rule or the exception, I made an analysis of the Verzeichniss from the beginning as far as the Astyci (Hesperidae), looking out every species and noting its place in Kirby, and this is the result. There is occasionally a coitus co-extensive with the limits of a modern genus, but in all cases solely by reason of some strong peculiarity of color or shape; as Chrysophanus, which includes the coppers, and is equivalent to Doubleday's genus of same name. But out of 255 coitus preceding the Hesperidae there are but 35 such, and of these, 13 have but one species each, 6 have two and 6 have three; *so that 25 of the 35 coitus contain but 3 species or less.* Many other coitus are homogeneous, but of this class the species under two, three or several are lumped together by Kirby in one genus, *so that such coitus are plainly regarded as equivalent to something less than genera, and the remaining coitus, 106 of the 255, are made up of species assigned by Kirby not only to distinct genera, but of sub-families and families.* For example, 1st Stirps, 2nd family, 4th coitus, Eueides, under which stand 7 species. In Kirby 1 goes to Eueides Hüb., 2 to Lycorea Doub., 2 to Melineae Hüb., and 1 to Tithorea Doub.

Or 5th coitus, Melineae, 5 species, 1 to same, Hüb., 3 to Heliconius Latr., 1 to Tithorea Doub.

Or 3rd family, 1st coitus, 10 species, 2 to Eueides Hüb., and 8 to Heliconius Latr.

And so Heliconius picks species at random from the 2nd family, 3rd and 5th coitus, and from 3rd family, 1st, 2nd, 3rd and 4th coitus, and from 4th family, 1st and 2nd coitus. And Eueides from 2nd family 4th coitus, 3rd family 1st coitus.

Or 2nd Stirps, Limnades, which comprises the Danaidae, 3rd family, 4th coitus Didonis, 2 species only, one of which stands in Kirby as Didonis Hüb., the 56th genus of the 8th sub-family Nymphalinae, the other as Elymnias Hüb., 1st genus of 3rd sub-family Elymninae. Now the coitus Elymnias stands in the 6th Stirps, Hamadryades, 4th family 5th coitus, *directly among the Vanessans, the species Antiopa being in the coitus next preceding, and Prorsa in the one next following!*

Under the head of Euploea stand 7 species, 6 of which are put by Kirby into Danais Latr. and one in Hypolimnas Hüb., and by a curious swap, the species which Hübner put into three other coitus are lumped

in one genus called Euploea Hüb.! And besides that the true Euploeas are put to Danais Latr., most of the species belonging to the coitus Hestia and Anosia are also put to Danais Latr., though they stand in two different families. And one of these Anosians, is a Limenitis (Disippus) as before related, while another is a Hypolimnas.

Third Stirps Napaeae, 1st family, 2nd coitus Hamanumidae, 6 species' 3 put by Kirby under same name, Hub., and this genus stands in the 1st family, 8th sub-family Nymphalinae, and 87th genus of same ; of the rest, 1 is Aterica Bois., the 88th genus, 1 is Zemeros Bois., of the 2nd family, 2nd sub-family Nemeobiinae, and 1 is Charis Hüb., which stands in the 2nd family, 4th sub-family, Lemoniinae. Now the coitus Charis is one of the Napaeae, as well as the coitus Hamanumidae, which last, as we see, has so gotten among the Nymphalinae ; and under Charis are two species only, Gyas and Anius. Kirby puts Gyas into Anteros Hüb., among the Lemoniinae, but looking up Anteros in the Verzeichniss, I find it a coitus of the Stirps Agrodiaeti, or Theclinae ; that is, in the other Tribe, *gentiles*, 7 Stirps away from the coitus Charis! That is the sort of wild goose chase one has between these two volumes.

Same Stirps Napaeae, 1st coitus Thysonotis, 2 species, 1 put by Kirby in Cupido Schrank, in the Lycaenidae, that is, according to Hübner, in the Stirps Agrodiaeti, the other in Dynamine Hüb., the 43rd genus of the Nymphalinae. Turning to Dynamine in the Verz., we find it among the Najades, 7th Stirps, thus defined : " the wings white banded below, the hind wings marked by two eye like spots." But Thysonotis was defined : "*both wings colored only at the margins, centrally white.*"

Fourth Stirps, Lemoniades, 1st family, 3rd coitus, Actinote, 4 species, 3 of which go to Acrea Fab., among the Nymphalinae, 1 to Alesa West., in the Lemoniinae.

Second family 1st coitus Melitaea, 6 species, among them Phaeton and Cinxia, all put by Kirby under Melitaea Fab., as are likewise the species of 2nd coitus. Then comes 3rd family, 1st coitus, Byblia, 1 species, put in Hypanis Bois., a genus of Nymphalinae beyond Melitaea in Kirby, by the breadth of all the Vanessidae, and the very next coitus, Cinclidia, has all its species put in Melitaea again.

Fifth Stirps, Dryades, 1st family, Reticulatae, "wings above striped like a grating, the hind wings below with colored spots on a pale yellow ground and marked by eye like spots." 1st coitus, Phyciodes, "both wings above with a band of spots, under side very delicately marked," 2

species only, one of which is our Tharos, and as these species of Phyciodes form a section of the natural group Melitaea, it is worthy of notice how Hübner's system compels him to put them into a separate Stirps. The 2nd coitus, same family, is Brenthis, "the hind wings below gayly clouded, pale spotted," and here come 5 species, 4 of which are put by Kirby to Argynnis Fab., while the 5th is Euptoieta Claudia, stuck in here because its hind wings are gayly clouded.

Next comes the 2nd family, 1st coitus, Argynnis, 10 species, all of which are put to Argynnis Fab. Then 2nd coitus, 3 species, of which 1 is Argynnis Fab., 1 Atella Doub., 1 Lachenoptera Doub. The 3rd and 4th coitus have all their species put to Argynnis Fab. The 5th, Colœnis, 4 species, 2 of which stand as Colœnis Hüb., 1st genus of the Nymphalinae, Argynnis being the 12th, and 2 as Eueides Hüb., amongst the Heliconidae. Definition of Eueides: "the fore wings twice spot-banded, the spots all yellow": of Colœnis: "wings striped, nearly plain beneath, the hind wings marked at base with white."!

The 6th coitus has 6 species, 1 put to Messara Doub., 1 to Atella Doub., 1 to Pseudacrea West., 61 genera ahead of Argynnis, and 3 go to Argynnis. So that Argynnis Fab. picks species from several coitus, situated in two families, among which are Heliconidae, Melitaeas and many distant genera.

The 6th Stirps, Hamadryades, consists of a mixed lot of species, many quite unrelated, and classed by Kirby in several distinct sub-families of the Nymphalidae, namely, in the 2nd, 3rd and 8th. In this last division are the Vanessans, a compact tribe naturally well characterized. The 1st coitus, 1st family, is Vanessa, comprising 3 species, Cardui, Huntera and Carye, and the coitus is defined: "wings above marbled, below with large peacock eyes." The next coitus is Pyrameis, 2 species, Atalanta and Callirhoe, defined: "wings red-banded above, marked like a peacock's tail below." These 5 congeneric species belong to 2 coitus, because 3 are marbled and 2 are red banded! By Kirby all these are classed under Pyrameis Hübner, regardless of the coitus character, which excludes everything that is not red-banded. By Scudder, (Revision, etc.) all are placed under Vanessa of Fab., *not of Hüb.*, which is right. Now where are the rest of the Vanessans, C Album, Antiopa, Io, etc., in the Verzeichniss? Naturally they should at least stand by the side of Cardui and Atalanta. Instead of that they are 3 families away, being in 4th family, 2nd, 3rd and 4th coitus, under the names Polygonia, Eugonia and

Inachia. Then comes the 5th coitus, Elymnias, placed by Kirby in his 3rd sub-family (the Vanessans being in the 8th) and next follow more Vanessans, viz., Araschnia Prorsa. And between Pyrameis and Polygonia stand Precis, Anartia, Temenes (which includes a Satyrid), Junonia, Apatura, Historides (which last is composed of the species Orion and Marchesius, totally out of place here, and put by Kirby in the 98th and 111th genera, 8th sub-family, Vanessa being 22nd). That is, according to Hubner's notions, *all these intervening species were nearer Cardui and Atalanta than were C album and Polychloros and Antiopa.* Polygonia embraces 4 species, among which are C Album and Progne. One of the rest, C Aureum Linn., under its other name, Angelica Cramer, is also a member of the next coitus, Eugonia, classed with Polychloros and Antiopa, as much at home in one coitus as the other, and a 2nd species of Eugonia, Polynice, is placed by Kirby in Rhinopalpa Feld.

The coitus Apatura is quite another thing from Apatura Fab., the genus recognized by Kirby and all authors, Hubner having had the habit of appropriating names right and left from any author accessible,* and with no credit, using them in altogether other senses than the original. Under it stand 12 species, 6 of which are put by Kirby in Precis Hub., 24th genus of Nymphalinae, 1 in Cymothoe Hub., the 89th, 1 in Siderone, the 111th. But the name Cymothoe is not in this Stirps Hamadryades, being borrowed from 7th Stirps Najades. It must be borne in mind that in every case where a species is taken from one coitus and credited to a genus named from another coitus, violence is done to Hubner's arrangement, and his system, even while made use of, openly condemned.

The 7th Stirps, Najades, comprises another lot even more mixed than the 6th. The 1st family, 2nd coitus, is Callianira, 1 species only, Ephestion Stoll. (our species Ursula), put by Kirby in Limenitis Fab., with the European species Sibilla and Camilla, which in the Verz. stand in coitus Limenitis, separated from the other by 4 families and 20 coitus! And in these 20 coitus are species belonging to all sorts of unrelated genera, Ageronia, Phyciodes, Colaenis, Siderone, etc., etc., *all nearer to Ursula, from the Hübnerian point of view, than Sibilla was.* Why? Because Ephestion is "dusky below, banded and spotted with yellow," while Sibilla is "blackish brown, pale banded below, partly blue, the

* Thus the coitus Hesperia is one of the Napaeae, as is also coitus Lycaena. Hubner proceeded in all respects as if he were the first and only systematist who had treated of the Lepidoptera.

bands *almost* broken into spots." And far away, in the 2nd Stirps, Limnades, is a third species of this genus Limenitis, namely, Disippus, because its wings are "black margined and white dotted." Here are three congeneric species, differently colored, and therefore placed in three widely separated coitus, and one of them in a distant Stirps! It seems odd, yet it is perfectly right under this alley and taw system. The only wonder is that men of scientific training can soberly call these coitus genera, or that two Hubnerians can look each other in the face without laughter.

Second family, 5th coitus Symphædra, 4 species, 2 put to same, Hub., 1 put to Athalia Hub., and 1 to Aterica Bois. To make up Aterica species are taken from 1st family 1st coitus, 2nd family 5th coitus, 3rd family 1st coitus.

Third family 2nd coitus, 3 species, 1 to Callizona Doub., the 51st genus of Nymphalinae, 1 to Gynæcia Doub., the 52nd, and 1 to Nymphalis Latr., the 104th genus.

Fifth coitus, 3 species, 1 to Catonephele Hub., 40th genus Nymph., 1 to Euphaedra Hub., the 85th, 1 to Siderone Hub., the 111th genus.

Fourth family 2nd coitus, 2 species, 1 to Phyciodes Hub., the 14th genus Nymph., 1 to Villa Kirby, the 57th.

Fourth coitus, 3 species, 1 to Colænis Hub., the 1st genus Nymph., 2 to Victorina Blanch., the 64th.

Fifth family 1st coitus, 4 species, 1 to 1st genus Nymph., 1 to 58th, 1 to 81st, 1 to 82nd.

Second coitus Acca, 13 species, of which 7 go to Neptis Fab., the 81st of Nymph., 3 to 82nd, 1 to Eurytela Bois., the 30th, 1 to Phyciodes Hub., the 14th. So that we see Phyciodes picking species from

5th Stirps,	1st family,	1st coitus.
7th "	4th "	2nd "
" "	5th "	" "

And Eurytela from

6th Stirps,	1st family,	1st coitus.
7th "	5th "	2nd "

Eighth Stirps Potamides, 1st family 2nd coitus, 2 species, 1 to Doleschalla Felder., the 28th genus Nymph., 1 to Siderone, the 111th. And Siderone picks from

6th Stirps,	3rd family,	1st coitus.
7th "	" "	5th "
8th "	2nd "	2nd "

And Morpho Fab. as it stands in Kirby picks from 3rd family 1st, 4th and 6th coitus, while between the 2nd and 4th comes Bia, one of the Satyrinae!

Ninth Stirps, Oreades, generally equivalent to what in Kirby is the 2nd sub-family of the Nymphalidae, the Satyrinae. 1st coitus Tenaris, 2 species, put under Tenaris Hub., which stands in the 4th sub-family of the Nymphalidae, the Morphinae.

Third family 1st coitus, Faunis, 2 species, 1 to Cleome West., among the Morphinae, the other to Taygetes Hub., the 57th genus of the Satyrinae. The very next coitus, Lethe, 1 species, put in Lethe Hub., the 7th genus of the Satyrinae. And the coitus immediately following is Hypna, 1 species, put as Hypna Hub., the 109th genus of the Nymphalinae!

Fourth family, 1st coitus Hipparchia, 7 species. 6 of which are put to Hipparchia Fab., the 32nd genus of Satyr., 1 to Calisto Hub., the 46th.

Third coitus Eumenis, 4 species, 2 to Hipparchia Fab., 2 to Oeneis Hub. The next coitus, Oeneis, has 5 species, 4 put to same and 1 to Hipparchia Fab.

This spurious genus, Oeneis Hub., thus made up by selecting from two coitus, each of which contains a mixed lot of Chionobas and Hipparchia, is quoted now-a-days as the equivalent of the well defined and natural genus Chionobas Boisduval, with a pretended precedence of some 30 years!

Hipparchia Fab. selects species from the 4th family, 1st, 2nd, 3rd, 4th coitus, and 5th family 7th coitus.

Ninth family, 1st coitus Callidula, 3 species, 1 doubtfully put to Pentila West., a genus of the Lycaeninae, 1 to Haematera Doub., the 48th genus of Nymphalinae, and 1 is a Heterocerous Moth. Scudder (Hist. Sketch) says that 2 of the 3 are Moths.

Second coitus, 3 species, 1 to Crenis Bois., 35th of Nymph., 1 to Callithea Bois., 56th of same, and 1 to Trichoris Hew., the 39th genus of the Lycaeninae. Now Oreades is claimed by the Hubnerians to be synonymous with Satyridae!

Under Maniola Schrank, Kirby lumps all the species of two families and eight coitus, except two species.

Second Tribe *gentiles*, 1st Stirps, Agrodiaeti. The 1st family has 11 coitus, every species except one under which is lumped in Kirby as Cupido Schrank, as are others in the next family and several coitus.

(To be Continued.)

ON PLATYSAMIA COLUMBIA SMITH.

BY F. B. CAULFEILD, MONTREAL, P. Q.

(Continued from April No.)

Taking into consideration the great difference in the lives and habits of the orders in question, I do not think the interbreeding of species of the genus *Tetrao* is any strong proof of the correctness of Dr. Hagen's conjecture. Robert Mudie, in his "Feathered Tribes of the British Islands," speaking of *Tetrao tetrix*, says: "During the latter part of autumn and winter the males live together in flocks and in a state of the most perfect harmony; but when the warmth of spring begins to be felt, and their plumage, which had become rather dull during the winter, begins to shine in all the beauty of its glosses, they separate from each other and fight stoutly for their females. They are then on the alert by early dawn, crowing and showing off the beauties of their plumage in a great variety of attitudes and gestures."

This, I think, is a great contrast to the life of the moth. The Grouse is gifted with the power of uttering cries or calls by which his presence is made known, not only to his own species, but to *every bird that is within hearing*. Of this the moth is entirely destitute. Further, when the call of the male Grouse has attracted the female, he makes his desires known to her by various gestures and attitudes, and any person who has given a little attention to domestic fowls or to pigeons, must be aware that birds can convey a great deal of meaning by gesture. This power, too, is wanting in the moth. Now, supposing that the males of one species of *Tetrao* were absent, and the males of another were calling, the females of the first species would hear them and their natural instinct would, I think, teach them to go to a cry that must at least bear a family resemblance to that of their proper mates; once in sight of the male his animated gestures would convey his desires, and though they might not actually keep in his pack, yet from their social habits they would keep near them, and seeing the gestures of the male, would sometimes submit to him in the absence of their legitimate partners.

But with the moth it is very different: in this case the attracting power emanates from the female, and is silent and invisible. The moth utters no cry by which her presence would be made known to the males

of other species, her attractive power, as shown I think by the experiments quoted, affecting the males of her own species only. Therefore I cannot see how the scarcity of any species of Atticii would be the means of producing hybrids; surely the absence of the males of one species would not increase the attractive powers of the female to such an extent as to affect the males of another species; if so, why did not the female *promethea* exposed by Mr. Bethune attract some of the male *cecropias* that came so freely to their own female.

There is another point to be considered in this comparison of birds and moths. During the breeding season a pack of Grouse consists of one male and several females, therefore if half of the pack were killed by hunting, the male would in all probability be amongst them. But in the moths the sexes are, I believe, nearly equal, and even if a species was extensively damaged by parasites, we have no reason for thinking that both sexes would not be represented by the few that escaped the attacks of their enemies, in which case there would be no need of their recurring to another species.

Dr. Hagen says that in the year that *columbia* was taken in Maine, the Atticii were extensively attacked by parasites in that neighborhood. In this locality (Montreal) in 1874, the year that Mr. Pearson found *columbia*, the Atticii were remarkably free from parasites; I do not think there was more than one in eight affected. Mr. Pearson found five cocoons of *promethea* (it is always rare here), four of which produced the moth; the other was dead in the chrysalis, but had not been attacked by parasites. Mr. Pearson also found twelve cocoons of *cecropia* on one tree, all of which produced the moth, and from a large number of cocoons of *cecropia* and *polyphemus*, taken in various places around Montreal, the number affected by parasites was comparatively small.

I suppose the reason that *cecropia* and *promethea* are selected as the parents of *columbia* is that the dark color of the latter bears a slight resemblance to the smoky color of the *male promethea*, but how is it that there is no trace of the falcate primaries of that insect in *either sex* of *columbia*, and how is it that in *columbia* there is no trace of the very remarkable manner in which the cocoon of *promethea* is attached to its food plant?

Dr. Hagen mentions several instances of hybrids having occurred amongst the Atticii while in confinement. I do not think much importance should be attached to this circumstance, as the interbreeding of

insects while in confinement is no proof that they will do so under natural conditions. Doubtless many of the Atticii will interbreed if shut up together, but from the stay-at-home habits of the females, I think they are about the least likely of all Lepidoptera to do so while in a state of nature.

But leaving theories and conjectures, let us see what evidence known facts will give us in favor of *columbia* being a good species. In (I believe) 1862 or 1863, Prof. S. J. Smith found a number of cocoons of *columbia*, three of which produced the moth. In August, 1864, Mr. G. J. Bowles found at Quebec a larva which in due time spun its cocoon. This cocoon was at first of a whitish color, but turned to a dark brown, and was then similar to the other cocoons of *columbia*. Mr. Bowles tells us that the moth died in the chrysalis state, owing perhaps to the presence of parasites. In speaking of this larva, Mr. Bowles says: "The principal difference (as far as I can remember), was in the number of red warts with which the larva was ornamented, *columbia* possessing *more* than the other species" *(cecropia)*. Dr. Hagen examined the dried larva skin of *columbia* (taken in Maine), and found the number of warts to be the same as *cecropia*, but the difference pointed out by Mr. Bowles was not in the *total number* of warts, but in the number of *red* ones, that is, the larva of *columbia* had more *red* warts than the larva of *cecropia* has.

In 1866, Mr. Bowles found another cocoon attached to a twig of thorn, but it was full of parasites, dead in the pupa. In the fall of 1867, Mr. Wm. Couper informed Mr. Bowles that he had seen a Saturnian larva spinning up on a gate-post. Mr. Bowles found this cocoon, which in the following May produced a female *columbia*.

In the winter of 1874, the Messrs. Pearson found a cocoon on a maple tree, in this city (Montreal), which next season produced a male *columbia*.

In Norway and Maine I belive both *cecropia* and *promethea* occur; certainly both these species occur in this locality (Montreal), but neither *cecropia* nor *promethea* have been recorded from Quebec. Now, Messrs. Couper and Bowles collected for a number of years at Quebec, but never met with either of these species; surely it is hardly possible that two experienced collectors would find a hybrid in the same locality, and neither of them find the species that produced it. Nor is it likely that a hybrid would occur in the same locality in such closely succeeding years as *columbia* did at Quebec, in 1864, 1866 and 1867. This, I think, is very

strong evidence, indeed, and weighing carefully all the facts of the case, the appearance of the moth and its cocoon, and the habits and instincts of the order and family to which it belongs, we are, I think, until further and more direct evidence to the contrary is produced, fully justified in considering *columbia* to be a distinct species.

NEW PYRALIDS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Botis sexmaculalis, n. s.

♂ ♀. This species in ornamentation approaches *partialis* Led., Taf. 9, fig. 8. Both wings clear pale lemon yellow. Primaries crossed by four equidistant lines, of which the first three from the base form brown spots narrowly outlined in black on the costal region. The third spot coalesces with an inferior spot on the line. The second line widens into a small spot on internal margin. The fourth line has a small dark spot on costa and one on internal margin. The apical half of the fringes are dark brown. The secondaries show a distinct discal point, another at anal angle and another at the extremity of vein 2, the most prominent of a line of minute terminal marks. Head and thorax yellow, collar brown; abdomen yellowish; legs yellow, spotted with dark. No. 239. Prof. F. H. Snow, Lawrence, Kansas; Expanse 18 to 20 mil.

Botis penitalis, n. s.

♂ ♀. This species in size approaches *crinitalis* Led., Taf. 12, fig. 2. The color is a yellowish ferruginous, more or less bright. Subterminal line indicated by a darker shading. Outer line dentate, slightly inflected on vein 2, linear, distinct and tolerably regular. Discal spots undefined, darker shaded marks, the orbicular small. Interior line upright, thrice waved. Secondaries pale or stramineous, pellucid, slightly ferruginous stained along external margin, with pale fringes and a faint transverse line visible medially. Beneath yellowish, the outer line visible distinctly on

primaries, and the subterminal showing as a dark discontinued shade band. The dentate line on secondaries continuous. Expanse 29 mil. No. 285, Lawrence, Kansas, Prof. Snow. "Common; feeds upon the "receptacle" of the Western Water-lily *(Nelubium luteum)*."

Botis erectalis, n. s.

♀. This species resembles the preceding, but is a little larger. The color is a dusty wood brown. The exterior line has the dentations rounded at their points and the line itself differs by being less erect, more outwardly produced opposite the cell and followed by a narrow pale shading. It runs more inwardly at external margin and seems to be without the sinus on vein 2. The stigmata are small, dark, solid, less diffuse and more distinct than in *fenilalis*. The hind wings are pale, dusted with fuscous with a median line visible centrally, a narrow terminal line and the terminal space more distinctly fuscous: beneath with a distinct discal mark. Fore wings fuscous, showing the markings of upper surface, the small reniform lunule and orbicular dot, evident. Expanse 34 mil. Albany, Prof. Lintner, No. 1,310.

Botis communis, n. s.

♂ ♀. This small species appears to be allied to the group of *ventralis*, but the venter is not discolorous. It varies from fuscous to orange yellow. Outer line finely denticulate, followed by a paler shade, upright, indented submedially thence perpendicularly to internal margin. Stigmata dark, small, solid, distinct. Hind wings pellucid; beneath paler than above. The secondaries vary to fuscous; the median line sometimes noticeable, beneath it can be made out as well as a discal spot. Expands 20 mil. New York (E. L. Graef, No. 144) to Alabama (Grote).

ON COPIDRYAS GLOVERI *(G. & R.)*

BY A. R. GROTE, BUFFALO, N. Y.

My kind correspondent, Mr. O. Meske, of Albany, sends me a male specimen presumably belonging to this species, which we referred originally to the Cuban genus *Euscirrhopterus* Grote, and (from a female)

considered congeneric with *E. Poeyi* Grote. The specimen now sent has an undivided frenulum and is unquestionably a male. It does not show, however, the aberrant wing structure of *Euscirrhopterus*. It might be referred to *Eudryas* but for the peculiar frontal structure. Instead of a tubercle, a wide plate extends forwards from the clypeus, with a lip-shaped outer margin, which is peculiar. I therefore make it the type of the genus *Copidryas*. The thorax is hairy, grayish black; two white lines run from the palpal tips above the eyes to the base of the head. The ordinary lines are expressed by metallic scales, and the black edged sub-equal stigmata are filled with similar scales. The female type of the species is not accessible to me and its description varies, as above noted, from my present male. It was, I recollect, not in very good condition; and it has been figured by Glover (Plate 85, fig. 34). From this figure my male differs by the absence of the shallow white median sinus, and white internal annuli to the stigmata, as well as by the narrow black band on the hind wings (even on its inner edge), and less brownish, more grayish black primaries: the orbicular is also more elongate. The yellow abdomen is black at anus and tufted with black scales at base. There is besides a mesial line of black scales on the dorsum. The eyes are naked. On the whole, I am inclined to consider this form as the ♂ of *C. Gloveri;* more material of both sexes and a comparison with the type are needed to make the matter certain. It is not unreasonable to expect some sexual differences, in coloring at least, in this group.

Larvæ of Thyreus Abbotii.—In response to Mr. Whitney's article with regard to the supposed sexual distinction in color of the larvæ of this species (Can. Ent., 8, 75), I can confirm it from my observations made in breeding larvæ of both colors in Brooklyn, L. I. I have never regarded the color as a sexual character and in my Sphingidæ of Cuba (Proc. Ent. Soc. Phil., 1865) I state distinctly that "the larvæ of *Thyreus Abbotii* and certain species of the genus *Philampelus* Harris, possess a tint of brown or green *indifferently* at maturity." I give the same fact with regard to *Eacles*. I regret that I cannot now refer more particularly to observations which were fresh in my mind when I made the above quoted statement.—A. R. Grote.

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NOTES ON THE VARIATION IN COLOR OF ŒDIPODA CORALLIPES AND ŒDIPODA CINCTA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Rev. Cyrus Thomas, in his Acrididæ of North America, page 132, says: "There are no permanent characters by which to distinguish alcoholic specimens of *Œdipoda coralliipes*, *Haldemanii*, *paradoxa* and *rugosa* from each other." He therefore considers them the same. Probably *Œ. discoidea* might be considered as another variety of the same. This much named grasshopper is abundant in Nebraska from the middle of June to about the middle of August. Owing to its large size (which is exceeded here only by the huge, wingless *B. magnus*) and colored wings it is one of the most conspicuous of our Orthoptera. It would be difficult, if not impossible, to breed grasshoppers from the egg; the only way, therefore, to establish the relationship of different varieties, is by comparing a large number of fresh specimens, seconded by close observation of their habits. I have therefore collected and compared a large number of specimens of this species during the past summer. I find but little difference between them except in the color of the wings and hind femora and tibiæ: but these vary considerably, as the following table will show:

Variety A. Wings yellow: inside of hind femora and hind tibiae yellow.

" B. Wings red; inside of hind femora and hind tibiae yellow (*Œ. paradoxa*).

" C. Wings yellow; inside of hind femora and hind tibiae bright red (*Œ. Haldemanii*).

" D. Wings red: inside of hind femora and hind tibiae bright red.

" E. Wings yellow; inside of hind femora whitish, ribs brown; hind tibiae yellow.

" F. Wings yellow; inside of hind femora brown, lower sulcus blue; hind tibiae yellow.

Variety G. Wings red; inside of hind femora brown, lower sulcus green; hind tibiae yellowish red.

" H. Wings red; inside of hind femora greenish blue; hind tibiae yellow *(Œ. discoidea)*.

Variety "D" I have frequently seen mated, but never with any other variety. This, then, may prove a distinct species, which point another season's observation may determine. The other varieties mate indiscriminately and assume the imago form at the same time. Probably a close search would reveal other varieties not enumerated above.

A similar instance of variation in color is afforded by another Nebraska species, viz., *Œdipoda cincta* Thos.

This species appeared sparingly last August. Its season was of short duration. It is of medium size and has spotted elytra similar to *Œ. coralliipes*. In Mr. Thomas' description of the ♀ the wings are said to be "transparent, base greenish yellow, a narrow fuliginous band across the middle, apex pellucid with a few fuscous dots." This description applies very well to perhaps half the ♀ specimens obtained here; although the band can hardly be called "narrow" as compared with our other *Œdipodas*. But specimens with the base of the wings *red* were quite as frequently seen, both males and females. The two varieties appeared at the same time, were found in company and disappeared together. Other than the color of the wings, there is no perceptible difference between them. The ♂, not described by Mr. Thomas, is smaller and darker than the ♀. It has several large fuscous spots at tip of wings; the inside of hind femora and hind tibiae are of a more brilliant blue, and the whole upper side of the abdomen has, in life, the same beautiful color.

The species, as taken here, differs in several particulars from Mr. Thomas' description of *cincta*, but is said by that gentleman to be identical.

The red winged var. may therefore be known as *Œdipoda cincta* var. *umbrator*. The measurements of both varieties are as follows:

Female—Length, 1.25 inches; elytra, 1.20 inches; hind femora, .65 in.
Male—Length, .95 inches; elytra, .90 inches; hind femora, .55 inches.

From the above notes it will be seen that color can not always be depended upon as a specific character in our Œdipodini. Undoubtedly the present number of supposed species could be greatly reduced by careful comparisons instituted on the field of collection.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

ADELA.

A. (Nematais ?) trifasciella, ♂. *N. sp.*

Eyes large and close together on the vertex. Palpi, base of tongue and large basal joint of the antennæ, head and upper surface of the thorax, clothed with long blackish hairs, darker than the fore wings are, except at their base. The antennæ are more than twice the length of the wings and silvery white, the basal third dotted above with blackish. Wings and legs rich dark brown, changing with the light to green, blue, violet, bronze and golden. At about the basal fourth of the fore wings is a narrow white fascia, about or just behind the middle is another slightly angulated posteriorly ; these two fasciæ are a little nearer together on the costal than on the dorsal margin, the first one being a little oblique, and before the apex is another costal streak perpendicular to the margin, and nearly opposite, but a little behind it, is a small dorsal white streak. Probably these two streaks are sometimes united ; and the first two fasciæ are much less distinct in the middle than on the margins, and are possibly sometimes interrupted. The tarsi are grayish fuscous, annulate with white at the joints. *Al. ex.* ½ inch. Received from Mr. James Behrens, of San Francisco, California.

A. fasciella, ♀. *N. sp.*

The white streaks and fasciæ on the wings resemble those of the preceding species, except that they are wider and more distinct. The middle one is not angulated, the first one *appears* to be a dorsal streak not crossing the wing, but this appearance may be the effect of slight denudation of the base of the dorsal margin ; and the third streak stops abruptly close to the dorsal margin, is not interrupted and is not nearer to the apex on the dorsal than on the costal margin. All this, however, is within the ordinary range of variation within the limits of a species, and this *may* be the female of the preceding species. But the head and appendages are clothed with saffron hairs, instead of blackish, and the hairs are shorter. The antennæ are broken off, except the basal half of one, which has alternate black and white joints at the base, becoming black simply flecked

with white further on; the basal joint is not swollen and the stalk is simple; the color of the thorax and fore wings is as in the preceding species, but the reflections are more green and blue; the hind wings are dark fuscous, *with a small white spot* about midway of the dorsal margin. The abdomen is narrow and pointed and of a rich brown hue. *Al. ex.* ½ inch. Mr. Behrens, San Francisco.

A. flammeusella, ♀. *N. sp.*

A single specimen with both antennæ broken off near the base. The basal joint of the antennæ is not incisorate, and my notes made when the specimen was received say that the antennæ are black annulate with white. The palpi also are gone. The head is clothed with saffron yellow hairs as in the preceding species, and the body, the basal joints of the legs and the fore wings are rich greenish brown, varying with the light to purple, bronzy green or golden; by gas light it appears bright golden and with the wings closed looks like a minute brilliant flame, whence the specific name. The fore wings have no markings except a minute whitish spot at the beginning of the costal ciliæ, which is also visible on the under side of the wing. It is a little smaller than either of the two preceding species, and like them was received from Mr. Behrens.

SEMELE.

S. argentinotella. N. sp.

Face and palpi pale stramineous, except the outer surface of the second joint of the palpi, which is black. Vertex, upper surface of the thorax and base of the wings of a rich black, the black of the base of the wings passing back along the fold and about the middle of the wing length, spreading gradually over the entire wing, but becoming more brownish and strongly bronzed. The costal and dorsal parts of the wing, where the black is confined mainly to the fold, are suffused with silvery white on a brown ground, which it almost obscures, and the white scales pass backwards into the bronzed brown parts of the wing behind the middle; and there is also a patch of suffused white at the base of the dorsal ciliae before the apex; the bronzed brown becomes deeper from the middle of the wing length backwards, and the apex is nearly black. There are two silvery spots at the end of the cell and six silvery costal streaks, or more properly, seven, but the first is on the extreme costa and seems to form part of the suffused white of that part of the wing; the

next is short and very oblique, and a little before the middle; and each of the succeeding five is a little less oblique and a little larger, the last pointing obliquely forwards: there is a streak at the apex (or exceedingly close to it on the dorsal margin), and there are six dorsal silvery streaks, the first five pointing a little obliquely backwards, and the sixth opposite and perpendicular to the last costal streak. The first and second dorsal streaks are opposite, respectively, to the spaces between the second and third, and third and fourth costal streaks (counting seven costal streaks in all); the third and fourth dorsal streaks are closer together, and are both opposite the space between the fourth and fifth costal streaks, and the fifth dorsal is opposite the end of the fifth costal. The dorsal ciliae are whitish with two dark brown hinder marginal lines behind the tip of the wing, the first about the middle and the other near the end of the ciliae. All of the silvery streaks are very smooth and a little raised. The antennae are black except at the base beneath and the apical fifth of their length, which are creamy white. Hind wings and abdomen (except its under surface) purplish fuscous; under surface and anal tuft creamy white. The basal joints of the legs are also yellowish white; but the tibiae and tarsi are black on their anterior surfaces, and annulate with creamy white. *Al. ex.* ½ inch. Kentucky in June.

S. argentistrigella.

Tinea argentistrigella, ante v. 5, p. 89.

This species structurally and in ornamentation resembles the one above described. The head is not roughened as in *Tinea*, the long scales of the vertex project forwards rather than upwards and those of the face project upwards to meet them. I have not examined the neuration of *S. bifasciella*, but that species differs from these two by having distinct tufts on the wings and the maxillary palpi folded more like those of *Tinea*. The labial palpi of these three species and the clothing of the head, form and size of the antennæ and probably the neuration of the wings are alike, and they are nearer my genus *Pityo* than to *Tinea*.

TINEA.

T. imitatorella. N. sp.

At page 85, vol. 5 of the CAN. ENT., I have described a species as *T. armitariella* (there misprinted *cunitariella*). It is not necessary to describe this species (*imitatorella*) otherwise than by a reference to the

description there given. It is proper to say, however, that the palpi and legs should rather be described as silvery gray, or as gray, with blackish markings on the legs, rather than as silvery white stained with fuscous. Captured specimens of *imitatorella* were for a long time placed among *cæmitariella*, though a close examination would have shown the difference. I did not, however, observe the difference until I bred from a new larval case a species which I recognized at first as *T. cæmitariella*. On examination of the specimen and comparison with bred specimens of *cæmitariella*—a single specimen of each—a difference was found in the costal and dorsal streaks on the wings, but an examination of other specimens showed that this could not be relied on, as both species vary greatly in this respect, as these markings vary from lines which cross the wings to mere dots on the margin. The legs of *imitatorella* are more decidedly black than in the other species, but the only important difference in the imago is in the antennæ. The antennæ of *cæmitariella* are robust and yellow banded above with fuscous lines, while those of *imitatorella* are quite slender and in color shining black. There is also a decided difference in the larval cases; that of *cæmitariella* is much depressed, narrowing before each end, that is, scalloped on each side before each end, the under side truncated at each end and the upper projecting like the bowl of a spoon beyond it; the case of *imitatorella* is scarcely at all depressed, it is not scalloped as in *cæmitariella*, the upper side does not project beyond the lower, and the anterior end is narrower than the posterior one.

T. crocicoverticella. N. sp.

Dark brown, in some lights strongly bronzed; head saffron colored; antennæ dark brown; palpi a little paler than the head; under surface silvery whitish faintly tinged with golden yellow; wings rather wide; ciliae grayish, with two brown hinder marginal lines, one at their base and the other beyond their middle. *Al. ex.* a little over ¼ inch. Kentucky.

T. thoracestrigella. N. sp.

Much like the above, but larger, having an *al. ex.* of more than ⅜ of an inch. The fore wings are simply dark brown, without bronzy reflections; and so are the ciliae, which show no hinder marginal line; the hind wings also are brown, though paler than the fore wings. The head is more reddish saffron, and a line of that color extends from the head to the tip of the thorax. Otherwise it resembles the species above described.

ON HOMOPTERA AND ALLIED FORMS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The species of *Homoptera* stand in need of a revision. They are usually but partially and confusedly named in such collections as I have had access to. With regard to the generic title, its acceptance is only provisional. Two species, *Phacocyma lunifera* Hübn. and *Phacocyma fluctuaris* Hübn., are unknown to me. The descriptions hitherto published in this genus are difficult to use for identification; no comparative characters are given, no analysis of the lines entered upon. The characters separating *Zale* and *Ypsia* are in great part unexplained, and of the latter dependant on larval characters. *Obliqua*, *duplicata* and *benesignata* are allied, the two first perhaps synonymous; *nigricans* is unknown to me; probably no one has yet correctly identified *calycanthata* of Abbot & Smith. Walker's and Bethune's "*calycanthata*" is *Zale horrida* Hübn. Guenée's *calycanthata* I think I have identified. *Minerea* I think I know. Walker's *herminioides* is *Epizeuxis aemula*! Leaving Walker's names out of the question, we have *lunata*, *edusa* and *Saundersii* generally fixed in collections; besides this, I have *calycanthata* Guen. and *albofasciata* Beth. determined. *Atritincta* and *edusina* are small dark forms from Texas. The present paper calls attention to the want of information and is written in the hope that material will come in so that the species may be worked over. It is necessary in studying the species to observe the course of the thread-like transverse posterior (t. p.) line. In *lunata* it is waved; in its course superiorly, opposite the cell, it will be seen to be dentate in addition to the usual central indentation. It is also dentate in *Saundersii* and *edusa*. *Rosæ* Behr., from California, from a single specimen, does not seem to me distinct from *lunata*. Drury's fig. (pl. 20) is hardly well enough drawn to decide, but the t. p. line appears to be given as somewhat jagged, so I do not venture to alter our usual determination of his species, which is our dark brown and stouter form. Another species, which I propose to consider as *minerea*, is similar to *lunata*, but differs by this line, frequently obliterate, being nearly even except the discal notch; it is a little waved inferiorly, but is not dentate superiorly. *Minerea* is of

the same facies and color as *lunata*, and is not to be confounded with more grayish or blackish forms which have this line distinct and even. It has the same subterminal dark shades as *lunata*, and the discal lunule (reniform) black and large. From time to time I have suspected in it *minerea*, and smaller specimens as *lunifera*, but it can not be the latter. It is very common in Canada and often goes under the name *lunata*. In pale specimens the median space and terminal, above the inferior black shade, are concolorous, yellow brown, and the dark markings contrast. The subterminal black lunate shade is diffuse and broader than in *lunata*. Beneath the hollow reniform is more evident than in *lunata*; I do not think there is a character in the lines of the under surface; in 10 *lunata* (Texas to Canada) these are variable. On the submedian space the t. p. line shows a slight notch or dot or thickening in *lunata*, wanting in *minerea*. *Minerea* is thinner bodied, and, perhaps, less compact and slighter winged than *lunata*. Else the two are nearly alike.

Saundersii is very like *lunata*, but has narrow whitish shades following the t. a. and subterminal lines; also on costa after the t. p. line. *Calycanthata* Guen. differs from *edusa* in the evenness of the t. p. line and richer color. *Albofasciata* differs by having a narrow white filling beyond the s. t. line. The two following forms seem to be undescribed.

Homoptera unilineata, *n. s.*

♂. This species is of the size of *Zale horrida*. It is totally pale brown, with all the lines indistinct except the subterminal. The wings are crossed by nebulous striæ of a darker hue. The orbicular is a black point. Reniform not legible on either surface. Subterminal line *continuous*, *even*, medially produced, geminate, its outer line bright ochre brown, space between its component lines pale. Terminal space faintly hoary, more distinctly striate. Hind wings concolorous with subterminal line alone distinct, *black*, obliterate on costal region. Wings dentate; fringes concolorous. Beneath without stigmata, paler, unicolorous, brown. Body parts concolorous. *Expanse* 43 mil. Canada, Mr. Saunders.

This cannot be *uniformis*, CAN. ENT., 7, 148, because that species is said to have "the subterminal line only seen as a black diffuse shade crossing the wings." This line is linear and very distinct in *unilineata*, and it is brown, its outer line bright ochre, on primaries. In *Zale horrida* there is a rounded discal sinus to the s. t. line, wanting in *unilineata*.

Ypsia umbripennis, n. s.

♀. Size and markings of *undularis*: black with the median space of primaries inferiorly and base of secondaries brownish. At once distinguished from *undularis* by two white linear shades accompanying the t. p. line and before it, from disc to internal margin. The lines and outline of the reniform velvety black. Subterminal line marked with whitish opposite the cell. Hind wings with the white linear shades from the cell to internal margin. Beneath dark brown with empty reniform and transverse lines. Head and thorax black. *Expans.* 43 mil. Grimsby, Mr. Pettit; London, Mr. Saunders.

Very much like *undularis*, but noticeably different by the white lines on both wings. This may be Walker's variety of "*squamularis*"; if so he has not unlikely transposed *coricias* and *undularis*.

NOTES ON LITODONTA, WITH REMARKS ON ONCOCNEMIS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

In a collection sent by Mr. Belfrage from Bosque Co., Texas, are 15 generally fresh specimens of this genus which I have carefully examined. The type of *hydromeli* ♂ is numbered 527 (violet label), the ♀ 246 (red label). The orange dots following the fuscous blotches of the subterminal line are less evident in the male, and at the base of the wing the orange powdering is less prominent. I am inclined to consider seven specimens, two males, five females, captured from May 3rd to May 21st, as typical.

The variation is in the extent of the orange shadings. The abdomen of the male is a trifle longer, and the hind wings more purely whitish. The antennæ in both sexes are feathered, the tips being simple; in the males the pectinations are a little longer. The hind wings of one female are almost blackish, save the bases, and there is but the slightest trace of orange on fore wings; another is very small, measuring but 26 m. m., the

orange observable only behind the s. t. line. These specimens are numbered 246, 247, 527, 528, 529, two unnumbered. There can hardly be a specific value due to the presence of the orange scales. Throughout the same characters of ornamentation prevail. With other six males no orange is apparent; the green approaches a bluish tinge, with possibly a clearer ground to the wing. Of these three were taken in May, two in August, and one in November. I cannot regard them as differing from *hydromeli*; there are a very few orange scales behind the more isolated spot of the s. t. line, between the second and third nervule, in the November ♂. At the present writing I do not feel justified in expressing the difference by a name. Two of these are numbered 248 and 531. Two other males are different in the total absence of all green color, the prevailing colors being white and blackish. The 10th and 11th of August are the dates of their capture, and they are numbered 530. It may be well to note this difference, whether it be specific or not, expressing it by the name *fusca*. This name is based on perfectly fresh specimens, not faded ones, originally, perhaps, green. There is the slightest possible trace of a warm tint behind the s. t. line. On the costa of the hind wings there is a little shading, the usual faint pale band being apparent. In these two examples there is no essential difference other than noted from the rest of the specimens. As is usual, the t. a. line is denticulate on the costa, then waved and geminate, the white costal filling being present in a marked degree, as well as the white filling to the sub-basal line. From a casual glance at these insects and from the numbers of Mr. Belfrage, I was led to expect two or three species. Now I have to record only one, yet *fusca* may hereafter lay claim to specific value.

Lederer, in writing of the genus *Oncocnemis*, says that the species are found in the Ural and Altai Mountains, and we have no information of any other European locality. Mr. Grote first discovered it in this country, as found in Colorado, thus stamping it more thoroughly, as he thought, as a mountainous insect. But lately it has been captured in three widely different localities. *O. riparia* Morrison = *Chandleri* Grote, found on Staten Island, N. Y., by Mr. Fred. Tepper; *O. Chandleri*, found in Erie Co., N. Y., by Miss Mary E. Walker; *O. augustus* Harvey, collected by Mr. Belfrage in Bosque Co., Texas. Mr. Grote has just described another species, *O. Saundersiana*, Grimsby, Canada (Mr. Pettit). We have here a very wide range, showing conclusively that its habitat is of the low as well as the high lands, of the south as of the north.

NEW MOTHS.

BY A. R. GROTE, BUFFALO, N. Y.

Botis submedialis, n. s,

Allied to *marculenta* G. & R. Stouter, of a duskier yellow. Distinguished by the open, fuscous-ringed discal spots and by the presence of a similar spot on the median space inferiorly, below the median vein. These ringed spots are inconspicuous. The subterminal line of *marculenta* is obsolete. Secondaries with a broader angulated median fuscous facia; the subterminal again wanting. Beneath fuscous, with the outer transverse line on the fore wings picked out by interspaceal pale blotches.

Expanse 27 mil. Hab. Canada (Mr. Saunders).

Hydrocampa ekthlipsis, n. s.

Size of *genuinalis* Led., with the wings more pointed and the external margin more sinuate. Dusky yellow with white spots margined by black lines. Two of these spots superposed on median space, the lower the larger, pyramidal. A large white spot open to costa at outer third, its outer edge rounded; in *genuinalis* this spot has its outer edge alone distinct and concave. A fine brown line, submedially angulate, follows this outer spot on the yellow ground color of the wing. Then a subterminal whitish shade band is bordered inwardly by a diffuse dentate brown line, and outwardly by an even dark line; terminal space even, yellow. This ornamentation is repeated on hind wings where the median spots are confluent. Beneath as above.

Expanse 22 mil. Albany (O. Meske); London (Mr. Saunders).

Eurymene rosaria G. & R. MS.

Entirely pale yellow with the transverse lines appearing as diffuse darker bands, the outer stained with blackish and pink at internal margin. External margin of fore wings rounded. Costa at base flushed with pink. Hind wings with an olive-colored curved abbreviated band at internal angle, outwardly diffusely pink. Beneath more brightly yellow, unicolorous, with the secondaries pink beyond the flexed outer line. No discal marks. Abdomen beneath and fore femora pink. This species has been distributed under the above MS. name, but not as yet described.

It is said to feed on Willow (Saunders). It is a well-sized species with indeterminate lines and no discal spots. The female expands 38 mil.

Eurymene Kuetzingi Grote.

A description and the type of this purple-black species have been sent to Prof. Packard for publication in his expected monograph of the Geometræ. It is named for Mr. Kuetzing, of Montreal, who found the species.

Sisyrosea, n. g.

The type of this genus is the *Limacodes inornatus* of Grote and Robinson. *Sisyrosea inornata* has the male antennæ bipectinate, with converging setose branches, throughout their length. The palpi are prominent, the body thickly scaled. The moths are of the size of the species of *Euclea* as defined by Packard. The color recalls the sack-bearing species of *Perophora*. *S. inornata* is immaculate, without lines (Am. N. Y. Lyc. N. Hist., 8, 1866).

Sisyrosea Nasoni, n. s.

♂ ♀. This species is of a pale brownish color, like its congener, sparsely sprinkled with black. An oblique dark brown line crosses the fore wings from apical third of costal to basal third of internal margin. A second subterminal dark brown line crosses the wing straightly. Both lines are faintly pale bordered outwardly. The thorax is slightly brighter, reddish tinged. *Expanse* 1 inch to 1¼.

Collected by Dr. William A. Nason, after whom the species is named, in Virginia.

Canadian Insects at the Centennial.—It will please our friends to know that the collection of insects sent from the Entomological Society of Ontario to the Centennial Exposition in Philadelphia, arrived there in excellent order. Visitors will find it displayed in the Canadian department in the Agricultural Hall. There are eighty-six cases in all, arranged in a double row on a suitable stand, which is over seventy-six feet in length. We think the collection does great credit to the energy and industry of our members.

NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part II.

BY W. H. EDWARDS.

(Concluded).

In coitus 26 are 4 species, 3 of which are put in Myrina Fab., one of the genera of the Lycaeninæ, and 1 in Euselasia Hüb., of the Lemoniinæ. But the coitus Euselasia is in the other Tribe, and third Stirps of same, the Napaeæ!

Second Stirps Archontes (Papilio, etc.), 1st family Heroici, 2nd coitus Jasonides, under which stand Machaon and Turnus. Third coitus Euphoeades, under which stand Glaucus (black female of Turnus), Troilus and Asterias. That is, according to the Hübnerian view, Turnus is nearer to Machaon than to its own female, and Glaucus is nearer to Asterias than to its own male! In Scudder's Revision he puts Asterias in the genus Amaryssus Dehman, and Glaucus into Euphoeades Hübner, bringing Turnus out of Jasonides to join his mate, and puts Troilus into a new genus, calling it Pterourus Scopoli, 1,777. But in the Hist. Sketch he sees fit to condemn Scopoli's Pterourus with ignominy, in spite of the inexorable, on account of "the incongruity of the materials of which the genus is composed." However Scopoli's group only contained Papilios, Theclas, Hesperiuns and heterocerous moths, and why it should be so treated when Hübner's amazing coitus are called generic and made much of, is not clear to the average mind.* But as it would not do to leave Troilus outside because of Scopoli's bad taste, Mr. Scudder felt compelled to utilize Jasonides, and into it is now thrust Glaucus, with which the *ghost* of Hübner may well feel disgusted. After he had gotten his little

* I have taken some pains to compare the coitus names with the generic names given in the Hist. Sketch, to see if any had been rejected on account of the "incongruity of the materials," but in no case do I discover that this has happened. In Callidula, where the Sketch says the coitus is made up of one butterfly and two moths, the author merely suggests that the "genus may be referred to the heterocerous lepidoptera." Had there been two butterflies and one moth, he would have referred it to the butterflies.

black heap so carefully together, for a stranger to pick out one and toss it over to the yellows, shows a degree of irreverence for Hübner's arrangement that is disturbing. So it happens, that in the various works of Mr. Scudder, Troilus has gone by three different generic titles within five years, namely, Papilio Troilus, Pterourus Troilus and Euphœades Troilus! Now all this trouble could have been avoided had the genus been called Pterourus Scudder, as it really was. Scopoli had no more to do with Scudder's genus Pterourus than had Julius Cæsar.

All the first 18 coitus of the first 2 families of the Archontes are put by Kirby in Papilio Linn., he paying no heed to the Verzeichniss divisions of this genus. The 4th coitus, 1st family, contains 6 species, of which our Cresphontes is one. Another is Pelaus Fab, which is given in the Verz. as a synonym of Torquatus Cram., and looking up the latter in Kirby, it stands as male of a distinct species whose female is Caudius Hübner, which in the Verzeichniss is in the 2nd family Priamides, separated by one family and nine coitus from its mate!

In 5th coitus stands Pammon Linn. Its variety Mutius is in the 6th as are also its females, Theseus and Romulus.

In the 2nd family, Echemon Hübner is male, and is in the 1st coitus, while its female, Echelus, is in the 2nd coitus. So in 1st is Tellus, which is the female of Sesostris, in 2nd. And Marcius in 1st is female of Aeneas in 2nd. And Anchises Linn. in 1st is a synonym of Lysander Cramer, which is in the 2nd.

In the 6th coitus are two species only, one of which stands in Kirby No. 19 on the list of Papilios, the other No. 91. And all through these two families the species skip about in Kirby from one part of Papilio to another, two adjoining species in one coitus being often separated by species which go to form parts of several other coitus in the Verzeichniss. Thus, between Anchises Cramer and the next species, Echemon, of the Verz., stand seven species in Kirby, all of which are enumerated by Hübner, and are scattered over 2 families and 3 coitus. So between Ulysses Linn. and the next in same coitus, Philenor Fab., stand in Kirby 23 of Hübner's species, from 2 families and 9 coitus.

What better illustration could be given of the true nature of this unnatural system than is displayed in these Papilios, the coitus based on no tangible character, the species raked together in heaps according to color or size of wing; males parted from their mates, varieties from the parent species, one dimorphic form from its fellow; congeneric species in

different parts of the field and even over the fence in the next one, while the most distantly related species of the genus lie side by side. Is it possible that such assemblages deserve to be treated as genera!

Mr. Scudder bears hard upon Herr Koch, because he divided the Papilios according to the presence or absence of tails, as *caudati*, *acaudati*, etc., and calls it "an extraordinary case of the survival of the spirit of mediæval science; would not have been excusable, scarcely tolerable, if it had been proposed in the middle of the last century; it is astonishing that it was allowed to appear in the respectable journal of Stettin, and of course they must drop," etc. (Hist. Sketch). But really I do not see why Koch should be thus flouted for dividing the Papilios in 1860 by their tails, when in 1875 Jasonides is pronounced by Mr. Scudder himself a satisfactory genus, "the hind wings tolerably long and tolerably short tailed." Or Heraclides, "the hind wings tolerably short and broad tailed." Why not the same sauce for both sexes of the goose!

Third Stirps Andropoda, 2nd family, 3rd coitus Zerene, thus defined: "Wings bright yellow, black margined, red fringed," and here stand the yellow species of Colias, namely, Palaeno, Caesonia, etc. In the 4th coitus, Colotides, come the orange species of Colias, Edusa, Eurytheme, etc., and it is defined, "wings above reddish-yellow with reflections, black margined." No more unreasonable than hundreds of other coitus, and showing very clearly that a coitus is a group of less value than a genus, in some cases. In others they are greater than a genus, as I have said: and if any of them are co-extensive with a genus, it is plainly by the merest chance. I would note here that Colotides would certainly have embraced the N. Am. Colias Eurydice, which is congeneric with Caesonia, but reddish, while the latter is yellow. And the female of Eurydice would as certainly have gone in a different coitus, had Hübner known of it.*

In this Stirps, Pieris Schrank picks species from 1st family, 1st, 2nd, and 8th to 12th coitus.

Tachyris Wall. picks from 2nd, 3rd, 6th, 10th, 11th, and also 2 species from the 3rd Stips of the 1st Tribe, Napaeae!

Pontia Fab. selects from 1st family 4th, and 2nd family 2nd coitus. And the 1st coitus of the 3rd family has 2 species, both of which are put to Dismorphia Hüb., one of the coitus of 1st Tribe, 1st Stirps, Nereides!

* It appears from the above that the name Zerene, supposing a coitus name to be applicable as a generic name, cannot be applied to the species Eurydice, and therefore to Caesonia, as Mr. Scudder has done in his Revision, Zerene only including "bright yellow" butterflies. Let us respect Hubner as well as admire him.

And so I might go through the rest of the *gentiles* to the end of the Hesperidæ, and for all that matter, through the volume. But I think I have shown the "utter want of agreement between Hübner's groups and modern genera."

How incomplete and indefinite the characters given to the Stirps are I have shown, and yet these are of all the definitions in the book the ones especially requiring careful elaboration. There is nothing in them that prevented Hübner himself from assigning to one Stirps species which are congeneric with species of another. I have given repeated instances of this. The family has the same style of definition as the coitus, based almost wholly on color, and consequently we see that the limits of neither are at all heeded by the modern systematist. The family names are to-day, in spite of laws and canons, ignored as unmanageable, but the coitus are every whit as bad and can only be used by totally disregarding the characters assigned them by Hübner. In fact these characters in the hands of the systematist are as if they had never been written. He makes up his own genera upon principles which Hübner never dreamed of, and takes what species he likes and leaves what he likes all over this book. If he gave his new genus his own name as the maker of it, not an objection could be made. It certainly is his and can go by the name of another only by a fiction. But among the late genus makers—and genus making has become a special craft—the usage has obtained to select for the group of species to be distinguished, a name from some old author, most especially one of Hübner's coitus names, and whether or not any species enumerated under the coitus be included in the new genus is a matter of not the least moment, any more than whether the definition of the coitus is applicable or not, and affix to it the name "Hub., 1816." Now, why is that? It certainly says as plainly as words can make it, "Hubner created this genus and gave it this name, in 1816," which is false. But by saying it and sticking to it, the modern maker by his pertinacity gets a place for his spurious genus as by right of usage before long, and his claim of priority is held by himself and the rest of the guild to cut off all other authors from the fictitious date to the present day. The scandalous injustice of this proceeding ought to be apparent to every one concerned. And apart from the injustice, the immediate effect is to unsettle the nomenclature and to hold it in that condition. Mr. Scudder excuses himself for having introduced hundreds of names from Hubner and other ancient authors as generic, which names never before were heard of, and nearly all of which are used to supercede the work of com-

petent lepidopterists, by hoping that he "has done something towards introducing some degree of *fixity, logic and precision* in the generic nomenclature." It strikes me rather that "something has been done" in the direction of chaos. And when I consider the mischief caused by the manufacture of spurious genera, and the excessive multiplication of genera on characters almost too trivial to be specific, and the wholesale creation of genera by mere enumeration of species, or by the mention of a single species only as type, which has of late prevailed, I do not hesitate to say that it would have been better to-day for this science had not a new genus been promulgated these last fifteen years. Nearly the whole movement, in this country at least, during this period, has been based in error, and very few indeed of the genera will bear examination.

There is but one remedy for this state of things, and fortunately, it is simple. Let each genus created since the date when the Rules of the British Association were adopted, viz., 1842, be tried by those Rules, and *those found wanting be rejected, no matter who made them.* For genera before 1842, as between two names in use, the prior right should belong to the first named. *But no name then in use should give way to an obsolete or rejected name*, even though the latter be of prior date. And next, *let each genus be called by the name of its real, not reputed, author.* A genus will then stand on its own merits and we shall see but little more of this unseemly and reckless genus making. I hope to see the adoption of Rules to this effect by the Entomological section of the Am. Association at its next meeting, and this will be the first step of real progress in reforming the nomenclature. But the Rules already binding disposes of a very large percentage of the generic names brought forward in the Historical Sketch. Certainly of 400 or more taken from the Tentamen and the various works of Hübner, most especially from this most foolish work, the Verzeichniss bekannter Schmetterlinge.

To show that I do not stand alone in condemnation of Hübner as an authority for genera, I will give in conclusion the language of certain lepidopterists, *facile principes*, whose opinions on this subject are entitled to consideration.

Dr. A. Speyer, Ent. Zeit. Stett. 1875, after stating that he had never seen the Tentamen and therefore could not pass judgment upon its names, thus says of the Verz. bek. Schmett.: "*It passes for an undisputed principle that other rights are needed to introduce a new species than merely giving it a name. It must be accompanied by a description or a drawing*

which shall make it recognizable. This same principle is carried out no less in regard to generic names. They first receive their authority from the subjoined sufficient characterization. We may give the most liberal interpretation to this demand, and indeed must do so, especially with regard to the earlier authors. One may perhaps go so far as to regard a genus as sufficiently characterized by the species correctly placed beneath it. *But hardly any one could assert that the great majority of Hübner's genera could be considered as scientifically established even with the most liberal interpretation. The greater part of them are only described according to agreement, often very superficial, in color and markings and perfectly insignificant characteristics. The names in this catalogue have besides no more right to stand than other so-called catalogue names*—for instance, most specific names in the Vienna Catalogue. They may be used in the erection of new genera, since they are mostly well chosen, *but by no means have a right to supplant later but well founded genera.*"

"This work (Hübner's Verzeichniss) had been systematically set aside as an authority by most European entomologists because it was felt that his so-called genera were mere guesses founded on facies alone—happy guesses no doubt sometimes, but as frequently wrong as right—and wholly without such definition as was held, even in his own day, to be required to constitute a new genus. . . . . *The proper course to be taken is to reinstate every name which of late years has been made to give place to one of Hübner's, and further to treat the Verzeichniss as a mere Catalogue which can never be quoted as an authority for genera.* . . . . Such old names as Chionobas, Agraulis, Eresia, Terias, Callidryas, Anthocharis, with many more, are changed for others which most of us have never heard of, and which generally are to be found in no other work than Hübner's obsolete and worthless Catalogue. . . . . As a matter of justice it may be maintained that we should recognize the careful and elaborate definition of a Doubleday or a Westwood, rather than the childish guesses of a Hübner, *and should quote the former as the authority for the genus, even should they out of courtesy have adopted the names of the latter.*" A. R. Wallace, Ann. Address, before cited.

"We cannot approve the names borrowed from the coitus of Hübner and applied by certain entomologists to their so-called genera. Hubner had never seen in nature the sixth part of the Lepidoptera which he has undertaken to group from their superficies. He has given no where a positive character to his coitus, in which the species are often assorted by chance. We could cite more than one instance where a variety is not

placed in the same group with its parent species. *What would be said of a botanist who should define his genera by the color of the flowers, the marbling or the pinking of the leaves!* It is for these reasons that, after the example of Ochsenheimer, of Latreille, of Godart, of Treitschke, of Duponchel, of Guenée, etc., we reject this sort of genera and consider them as not having been made." Dr. Boisduval, Spec. Gen. Het Sphin., 1874.

"We should likewise speak of the classification of Hübner, but we have never been able to comprehend the principle on which it is based. This author so often places in distinct genera species between which are scarcely found specific distinctions, that the whole forms for us a chaos almost unintelligible. In our opinion, while Hübner is the first of iconographers, he is the last of systematists." Boisduval, Spec. Gen., I. p. 153, 1836.

"I must not pass in silence his Systematic Catalogue, to which there seems some disposition to return after it has been justly neglected for thirty years. I cannot deny that it contains some happy hits, some natural groups, but one could scarcely assert that there are many such. On the other hand, he has multiplied genera with an incredible recklessness. Many pages would be required in citing all the examples. . . . . Our Xanthia are scattered over 7 coitus. Agrotis comprises not less than 17! And yet one would be mistaken if he thought this extreme division permitted Hübner to bring together only analogous species. The genera of fewest species are often the most heterogeneous. (Here several examples are given.) His Tribes agree among themselves no better than his genera. I have given these examples because there seems to day a desire to erect the Verzeichniss into an authority, and it was well to show why I consider it, with my associate (Boisduval), as not having been made, and why I have not felt myself obliged to employ the generic names of this still-born work." Guenée, Spec. Gen. Noct. I, Pref., p. 73, 1852.

NOTES ON PREPARATORY STAGES OF DANAIS ARCHIPPUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

On the 14th May last I found several eggs of *archippus* on milkweed. These hatched on the 17th inst. On the 19th all had passed first moult. On the 21st all had passed second moult. On the 22nd two

passed third moult. On the 25th these two passed fourth moult, and were one inch long. They continued to grow till the 29th, when they measured 1.8 inch, and in the morning had fixed for chrysalis. Made chrysalis in the afternoon of same day, and the butterflies emerged on 9th June. Time from hatching to chrysalis 12 days. A female, which I confined on milk-weed, laid eggs on 24th May, which hatched on 30th, by which the duration of the egg stage would be 6 days, of the chrysalis 11 days, deposition of the egg to the butterfly 29 days. This is surprisingly rapid. The larvæ which delayed a little the third moult passed the same shortly after, and became butterflies within from one to three days after the first two mentioned. There has been some uncertainty as to the number of moults of this species, some authors giving three only. I have had for two years a series of drawings made by Miss Peart, in 1873, representing all these stages, as followed out by herself, near Philadelphia, and she found and figured the four moults. In this region there are at least two broods annually, the later one appearing about the 1st of October, and the butterflies hybernate.

CORRESPONDENCE.

DEAR SIR,—

In a recent number of the C. E., my friend, W. V. Andrews, desired to know if any of the readers of the ENT. had taken brown larvæ of *Ceratomia quadricornis*. Three years ago they were common here on the English elms, and a large proportion of them were brown; indeed, the green ones were the exception. ROBERT BUNKER, Rochester, N. Y.

DEAR SIR,—

I recently had the pleasure of receiving a female *Smerinthus cerisii* Kirby, which I believe is the only known example of that sex. This interesting specimen was captured in Maine. Yours truly,

GEO. W. PECK, New York.

The Canadian Entomologist.

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ON CATOCALA PRETIOSA, N. S.

BY J. A. LINTNER,

New York State Museum of Natural History, Albany, N. Y.

The species is closely allied to *C. polygama* Guen. Its distinctive features may be more clearly appreciated by a differential comparison with that species. The basal region is conspicuously and broadly shaded with black, deepening toward the anterior transverse line; in *polygama*, shaded with ferruginous. The anterior transverse line is moderately oblique in its general direction, tending to the posterior third of the internal margin, geminate, distinctly separated by white below and slightly above the submedian: in *polygama* the line is quite oblique, tending to, or very near to, the internal angle; preceded below the submedian by gray and ferruginous scales.

The posterior transverse line has the extra-cellular teeth moderate, unequal, the lower one in cell 4 being improminent; moderately outwardly angulated (not toothed) on the median fold before the sinus; the sinus short, not extending to the middle of the wing, the line narrow with ferruginous and white below it; from the sinus running direct and slightly outwardly oblique to the internal margin, followed by a white line: in *polygama* the two teeth are conspicuous and nearly equal; sharply toothed outwardly on the median fold, as in *crataegi;* sinus long, reaching the middle of the wing, the line broad, with ferruginous on each side and without white below; below the sinus, a long and sharp tooth bordering the internal margin.

The two transverse lines are separated on the submedian nervure by a space equal to the width of cell 2 on the terminal margin, whence they

run parallel to the internal margin: in *polygama*, they are nearly or entirely united on the submedian, beyond which they widely diverge and again wholly or nearly unite on the internal margin.

The reniform is broadly surrounded by white: in *polygama*, narrowly. The sub-reniform is round, its outline defined by black scales; it touches outwardly the median shade line on vein 2; of the two transverse lines, it is nearer to the posterior, or midway between them: in *polygama*, it is subquadrangular, defined by ferruginous scales, is quite removed from the median shade line, and is nearer to the anterior transverse line, sometimes quite approximate to it.

The subterminal line is dark brown: in *polygama*, pale gray. The posterior wings have the marginal band slightly narrowed on the median fold: in *polygama*, it is separated or quite constricted; beneath, the cellular fold is shaded with black (not in *pretiosa*).

In size it is smaller than *polygama*, five examples of which before me measure in expanse of wings, males 1.80, 1.85 and 1.90 inch; females 2 and 2.1 inches. *Pretiosa* males 1.60 and 1.70 inch; females 1.80 inch. The wings are proportionally broader than in *polygama*, they are more clouded with black basally, with more white medially, and with less ferruginous in the terminal region.

Three examples of the species were captured by me at sugar, at Schenectady, N. Y., last year—the two males, in perfect condition, on July 8th and 10th, and the female, somewhat worn, on July 16th.

A fine example of *C. cratægi* Saunders was also taken by me at sugar, on the 17th of July. I had recognized it as an undescribed species at the time of its capture, and had so indicated it in my collection. With the larval state of nearly all of our Catocalas unknown, it is very gratifying that Mr. Saunders has been so fortunate as to be able to accompany the description of the imago with that of its larva.

C. polygama was taken but once by me at sugar last season, viz., on the 7th of July, in perfect condition. The examples which I have seen of this species present very little variation. The variability which has been ascribed to it has its existence probably in the confounding with it of *cratægi*, *pretiosa* and perhaps some other species.

NEW SPECIES OF NEBRASKA ACRIDIDÆ.

BY LAWRENCE BRUNER, WEST POINT, NEBRASKA.

Œdipoda Nebrascensis, n. s.

Elytra and wings longer than body; elytra spotted; wings blue at base, gradually merging into black.

Female—Vertex broad; middle foveola circular, open in front with a slight median carina; frontal costa rather narrow, somewhat expanded at ocellus; sulcate, expanding at lower extremity. Lateral costa nearly parallel to frontal. Median carina of pronotum crested, as in *Œ. Carolina*, only much higher; cut in front of middle by last transverse incision of pronotum. Posterior part highly arcuate; anterior part nearly straight. Lateral carinæ slight, approaching a little in front of middle, where they are cut by two transverse incisions; then running parallel to median carina to base of occiput. Posterior margin of pronotum as in *Œ. Carolina*. Elytra wide, slightly arcuate in front, nearly straight behind; about one-third longer than body. Wings one-eighth of an inch less. Posterior femora a little shorter than body, slightly furrowed below. Antennæ about as long as head and thorax.

Color—dried (not alcoholic)—Dirty yellow. Head and pronotum cinereous, with a greenish tinge. Clypeus lurid. Elytra dirty yellow, spotted with brown, the spots on outer half running together, forming irregular narrow transverse bands; median vein brown half its length, bordered by yellow. Spots on inner portion large. Wings bluish at base for about one-fifth their length; outer third yellowish, sprinkled with brown spots at apex. The yellow forms a continuous wide band along the posterior portion and around the inner angle half way to the base. Disk black. Posterior femora crossed on outside by two light brown bands; internally by two black bands. Apex black. Posterior tibiæ yellow, with dark spines. Venter yellow. Dorsum blue with a yellow spot on centre of each of the 1–4 segments, remainder brownish. Sides brown, antennæ rufous.

Length—♀, 1.75 inches; expanse of wings 4 inches; elytra 1.90 inches; posterior femora .85 inch.; posterior tibiae .75 inch; antennae .60 inch.

Habitat—West Point, Nebraska; in August. Male unknown.

Pezotettix gracilis, n. s.

Frontal costa sulcate below the ocellus in ♂ ; slightly depressed at the ocellus in female. Elytra small. Median carina of pronotum slight, cut by the last transverse incision of pronotum behind the middle, also by the central transverse incision, nearly straight. Lateral carinae distinct, approaching near the centre. Posterior margin of pronotum obtuse in ♀, sulcate in ♂. Elytra short and narrow. Posterior femora as long as abdomen. Male cerci short, rounded, and slightly spatulate, curved inward; lower ends somewhat curved upward and flattened. Female cerci short, thick and pointed.

Color—Varies from a bright green to an olive brown. Face green; cheeks whitish; a broad black stripe from the eye to last transverse incision of pronotum, sometimes to extremity of pronotum. Below this the pronotum is whitish. Disk of pronotum brown. Occiput brownish. Antennae olive green, tips black. Posterior femora pea green, sometimes olive green, with tip black. Posterior tibiae green; base and spines black. Venter white. Dorsum from green to light brown. Male's last segment of abdomen margined posteriorly with black. Sternum greenish white.

Length of ♀, .75 inch.; elytra .13 inch ; posterior femora .45 inch. ♂ .62 inch.; elytra .10 inch.; posterior femora .40 inch.

Habitat—Omaha, Nebraska ; August to October.

Pezotettix occidentalis, n. s.

Large, stout. Elytra in female half as long as abdomen; in male about two-fifths as long. Male antennae as long as posterior femora.

Vertex not prominent, carinate; foveola wide, slightly elongate. Frontal costa somewhat sulcate in male; plane in female. Eyes large, inflated in male; ordinary in female. Pronotum with sides parallel; margins acute in male, rounded in female. Posterior transverse incision behind the middle; deep in male, ordinary in female. Elytra about two-fifths the length of abdomen, wedge shape. Four anterior femora inflated in male, much curved. Posterior femora passing abdomen one-fifth of their length. Female cerci short and pointed; male cerci large, flat, strong, slightly notched anteriorly, curving inward at extremity, where they are spatulate. Genitial plate shape of letter U, large and wide. Entire insect sparsely covered by short hair.

Color—Male dark piceous, variegated with white. Face cinereous; cheeks whitish, occiput piceous with a white stripe from eye along lateral

carinae of pronotum to last transverse incision of pronotum. A wide black stripe on side of pronotum from eye to last transverse incision; below this is a narrow white line bordered below by a narrow black line; remainder dark brown. Eyes posteriorly streaked alternately with black and yellow. Elytra brown, lighter above, unspotted (sometimes a few spots visible). Posterior femora with three white and three black bands; lower inner side and sulcus bright red. Posterior tibiæ red, bluish toward base. Spines near base light; remainder black. Venter yellow.

Female differs from male in being of a uniform brown color. Eyes not colored, and bands on sides of pronotum nearly obsolete in some specimens, dim in others. Ovipositor varies from red to yellow, with black tips.

Dimensions—♀ 1.10 inches; elytra .31 inch.; posterior femora .55 inch. ♂ .95 inch.; elytra .25 inch.; posterior femora .51 inch

Habitat—Omaha, Nebraska; August to November.

ON A NEW CANADIAN BOMBYCID MOTH.

BY A. R. GROTE, BUFFALO, N. Y.

Both sexes of a new genus and species referable to the group *Ptilodeutes* are represented in specimens taken by Mr. Geo. Norman (No. 52) at St. Catharines, and for which I propose the name *Ellida gelida*. A male of this species is also in the collection of the Buffalo Society, from New York State. The eyes are naked, ocelli absent, legs rather short and unarmed. The maxillæ are moderate; labial palpi short, applied to the front, second article shaggily haired, third distinct. The abdomen is untufted, hardly exceeding secondaries. Male antennæ bipectinate, densely setose; female antennæ more shortly and finely bipectinate. Head closely applied to the thorax. Anal hairs in the male gathered at each side, projecting slightly, not forming a prominent furcation as in *Coelodasys*. The habitus recalls the Noctuid group Bombyciae. Fore wings 12-veined, 5 intermediate between 4 and 6, cell open; 7 out of 8; 9 out of 8, a short furcation at apex. Hind wings with veins 7 and 8 separate, 7 running very close to 8 for about three-fourths its length from

the base of the wing; 5 weak; cell open; 6 out of 7 beyond, not *before*, a slight projection, on 7, which projection indicates the position of the cross vein. It will thus be seen that the neuration differs sensibly from that of the *Bombyciæ (Cymatophoridæ* H. S.) The position of vein 5 is different from that in the *Noctuelitæ;* but attention is called here to the fact that in the genus *Nolaphana* (which possesses ocelli) vein 5 is nearly midway between 4 and 6 on primaries.

Ellida gelida is a gray moth, having a superficial resemblance to *Pseudothyatira expultrix.* The collar is discolorous, pale buff, recalling that of *Pygaera pucephala*, edged with black. The wings are long, costa of primaries convex. Interior line represented by three parallel curved black lines, obsolete inferiorly. A black curved streak in a whitish shading on the disc. Outer and subterminal and basal lines faint. Outer line dentate. Between the subterminal shade and the very narrow even continued terminal line at base of fringes, is a distinct line of blackish brown hue, narrowly interrupted on the veins and inferiorly disconnected in the female specimen before me. Hind wings uniform pale fuscous, with whitish fringes. Beneath whitish fuscous, with a line and spot on hind wings. *Expanse* 42 mil.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

Since the reprint of Kirby's Fauna Boreali-Americana began, much has been learned concerning the species of Coleoptera therein described or mentioned, so that at the present time very few remain unidentified. Through the kindness of the authorities of the British Museum, every facility was granted to Dr. Leconte and myself for the study of Kirby's types, and the results of these studies have already been made known by Dr. Leconte. It will be noticed in very many places that the synonymy here given differs very greatly from that given by Mr. Bethune, who compiled from the best known sources all that was at the time known or guessed concerning Kirby's species.

The present paper is necessarily in great part a compilation, but sufficient new material is presented to render it worthy of appearing as a whole, so that Kirby's species may be at once determined without the necessity of consulting scattered publications.

A few words are necessary to a correct understanding of the paper. The species named by Kirby are in small capitals. Should names in their entirety remain valid, no remarks are made, as in 1, 16, &c. Should the generic name only be changed, the species is quoted as "is a ——," as in 25, 28, 37, &c. Should the specific name be changed, the species is quoted as in 3, &c., and the true name is in small capitals also. In some instances, Kirby's species not having been identified, the species have received more recent names and are well known; in this case the latter name (being a synonym) is quoted in italics, as in 58 and 59, so that those having the Kirbyan species under the more recent names may change them.

1. Cicindela hirticollis Say.
2. " repanda Dej.
3. " PROTEUS Kby., is DUODECIMGUTTATA Dej.
4. " OBLIQUATA Kby. This is a variety of the species previously described by Say under the name VULGARIS. Herbst anteriorly named the species TRANQUEBARICA with a false locality.
5. " vulgaris Say (see above).
6. " purpurea Oliv.
7. " ALBILABRIS Kby., is LONGILABRIS Say.
8. Casnonia pensylvanica Dej.
9. Cymindis MARGINATA Kby., is CRIBRICOLLIS Dej.
10. " UNICOLOR Kby. Subsequently described as *hudsonica* Lec.
11. Sericoda BEMBIDIOIDES Kby. is a PLATYNUS.
12. Brachinus cyanipennis Say.
13. Carabus Vietinghovii Adams. This species is found in Alaska and extends its habitat toward British Columbia and also toward the Hudson's Bay region. Numerous specimens were collected by the late Robt. Kennicott in Alaska.
14. " ligatus Knoch is VINCTUS Weber.
15. Calosoma calidum Fab.
16. " FRIGIDUM Kby.

17. Helobia [Nebria] CASTANIPES Kby. An immature form of N. SAHLBERGI Fisch., described anteriorly to Kirby, from Alaska.
18. Chlaenius sericeus Forst.
19. " IMPUNCTIFRONS Kby. is PENSYLVANICUS Say.
20. " nemoralis Say.
21. " QUADRICOLLIS Kby. is TRICOLOR Dej. *var.*
22. " CORDICOLLIS Kby. This species, anteriorly to Dr. Leconte's visit to the British Museum (1869), was erroneously considered to be *chlorophanus* Dej.
23. " EMARGINATUS (Kby.) The type of this species could not be found in the British Museum. It is not identical with Say's species, and as the name is pre-occupied, it would be better to drop it entirely from our lists.
24. Platynus ANGUSTICOLLIS (Kby.) is not the European species of that name, but our common SINUATUS Dej.
25. Agonum extensicolle Say is a PLATYNUS.
26. " PICIPENNE Kby. is probably the species subsequently described as PLATYNUS *lutulentus* Lec. The varieties E and D are distinct and are Plat. RUFICORNIS Lec.
27. " SORDENS Kby. Has been named in some collections *fuscescens* Chaud.
28. " melanarium Dej. is a PLATYNUS.
29. " SEMINITIDUM Kby. Probably the same as PLATYNUS *chalceus* Lec.
30. " SIMILE Kby. In doubt.
31. " AFFINE Kby. is PLATYNUS *Harrisii* Lec.
32. " ERYTHROPUM Kby. The name is pre-occupied and PLAT. SUBCORDATUS Lec. must be used.
33. " cupripenne Say. is a PLATYNUS.
34. Calathus gregarius Say.
35. Platyderus NITIDUS Kby. is PTEROST. ERYTHROPUS (Dej.)
36. Argutor BICOLOR Kby. is PTEROST. PATRUELIS Dej.
37. " FEMORALIS Kby. is a PTEROSTICHUS.
38. " MANDIBULARIS Kby. is a PTEROSTICHUS.
39. " BREVICORNIS Kby. Probably the same as FASTIDIOSUS Mann. This and the preceding species belong to

the Cryobius group of Pterostichi, in which the species are very difficult to separate.

40. Omaseus orinomum Knoch. is a PTEROSTICHUS.

41. " NIGRITA Curtis (Kby.) This species is erroneously determined by Kirby and does not appear to differ from PTEROSTICHUS CAUDICALIS Say, from specimens in my cabinet from Hudson's Bay region.

42. " PICICORNIS Kby. is PTEROST. MUTUS Say.

43. Stereocerus SIMILIS Kby. is AMARA HAEMATOPUS (Dej.)

44. Curtonotus convexiusculus Steph. (Kby.) Erroneously determined by Kirby : is AMARA LATICOLLIS Lec.

45. " RUFIMANUS Kby. If the hind angles of the thorax are prominent, as stated by Dr. Leconte (Proc. Acad. 1873, p. 323), this species is rather LATICOLLIS than LACUSTRIS, as there stated. The species of AMARA in this vicinity need a careful revision, when their number will be considerably decreased. No actual comparison of Kirby's and our own types have been made, and any positive expression might mislead.

46. " BREVILABRIS Kby. Identical with the preceding species.

47. " LATIOR Kby. is AMARA *(Bradytus)*. Described since Kirby as *libera* Lec., *laevistriata* Putz. and *Oregona* Lec. (See Trans. Am. Ent. Soc., 1875, p. 128).

48. Poecilus lucublandus Say is a PTEROSTICHUS.

49. " CASTANIPES Kby. is a variety of 48.

50. " chalcites Say is PTEROSTICHUS SAYI Brulle.

51. Amara VULGARIS Latr. (Kby.) is not that species, but ERRATICA Sturm.

52. " INAEQUALIS Kby. is INTERSTITIALIS Dej.

53. " impuncticollis Say.

54. " PALLIPES Kby.

55. " LAEVIPENNIS Kby. is a smooth ERRATICA Sturm.

56. " DISCORS Kby. is CHALCEA Dej.

57. Harpalus PLEURITICUS Kby.

58. " BASILARIS Kby. is *obesulus* Lec.

59. " OCHROPUS Kby. is *desertus* Lec.

60. " INTERPUNCTATUS Kby. is probably merely a variety of ANISODACTYLUS NIGRITA Dej.

61. " LONGIOR Kby. is *longicollis* Lec.

62. Harpalus LATICOLLIS Kby. is ANISODACTYLUS NIGERRIMUS Dej.
63. " carbonarius Say is ANISODAC. CARB.
64. " ROTUNDICOLLIS Kby. is AMPUTATUS Say.
65. " STEPHENSII Kby. is AMPUTATUS Say.
66. Stenolophus VERSICOLOR Kby. is FULIGINOSUS Dej.
67. Trechus TIBIALIS Kby. is BRADYCELLUS TIBIALIS.
68. " AUFICRUS Kby. is BRADYCELLUS COGNATUS (Gyll).
69. " FLAVIPES Kby. is BRADYCELLUS RUPESTRIS Say.
70. " IMMUNIS Kby. is STENOLOPHUS CONJUNCTUS Say.
71. " SIMILIS Kby. is AGONODERUS COMMA Fab.
72. Isopleurus NITIDUS Kby. is AMARA SUBAENEA Lec.
73. Patrobus americanus Dej. is LONGICORNIS Say.
74. Peryphus BIMACULATUS Kby. This species of BEMBIDIUM occurs also in Colorado.
75. " SORDIDUS Kby. Immature specimen of the preceding.
76. " SCOPULINUS Kby. is BEMB. *gelidum* Lec.
77. " RUPICOLA Kby. is BEMB. RUPESTRE Fab.
78. " CONCOLOR Kby. is BEMB. *salebratum* Lec.
79. " PICIPES Kby. The type of this is in very bad condition. Uncertain.
80. " quadrimaculatus Linn. is a BEMBIDIUM.
81. " NITIDUS Kby. is a BEMBIDIDM.
82. Tachyta PICIPES Kby. is TACHYS NANUS Gyll.
83. Notaphus NIGRIPES Kby. A BEMBIDIUM which occurs also in Oregon and British Columbia.
84. " INTERMEDIUS Kby. is probably BEMBIDIUM *rapidum* Lec.
85. " VARIEGATUS Kby. The specific name is pre-occupied. It is now known as BEMBID. PICTUM Lec.
86. Bembidium impressum Gyll.
87. OPISTHIUS RICHARDSONII Kby. Occurs in British Columbia, Oregon, Northern California, and Colorado.
88. Elaphrus CLAIRVILLII Kby. for a long time called *politus* Lec.
89. " INTERMEDIUS Kby. This species forms one of the varieties of that known in our collections as *Californicus* Mann. I cannot see any difference between this and the European RIPARIUS.
90. " OBSCURIOR Kby. is probably a small *obliteratus* Mann.
91. Notiophilus aquaticus Linn. (Kby.) is SEMISTRIATUS Say.

(To be Continued.)

ON JACOB HUBNER AND HIS WORKS ON THE BUTTERFLIES AND MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

For a long time that school of Entomologists which has for its basis the view that there are but few genera in the Butterflies and Moths, and that the more minute characters which these insects offer are not of sufficient value to support genera, have held an almost undisputed sway in the scientific literature on the subject. The first opponent of these views was Jacob Hübner, whose works form the subject of the present paper. A single author, in the comparatively obscure town of Augsburg, in Germany, Jacob Hübner found no adherents to his views, and his works fell into obscurity. The Viennese Entomologists misapplied many of the few generic names of Hübner they adopted, and abused him. Their example was followed by the French Entomologists, including the abuse. In England Hübner's ideas found a more favorable reception from Stephens in 1829, and here and there, in Germany itself, a sort of half recognition has been extended to Hübner from time to time, in some few cases and under some limitations.

So far as Hübner's works are concerned, they must be studied from two separate aspects. First as to Hübner's fundamental idea that the Butterflies and Moths offer many genera, independent of the question as to whether the names Hübner proposed in consequence for these genera, be reinstated in modern systems of classification or not.

And here the question arises respecting the value of all systems of classification and as to their purport. And we shall be agreed that while our conceptions of genera and species and other divisions are abstract, the purpose of our system of nomenclature is to express briefly interrelationship among animals, no less than to distinguish them. Under the view that dissimilar structures are allowed to be embraced under the same generic name, our systems become clearly defective to this extent. And as *the* question of to-day is the origin of the different kinds of animals, we are clearly on the right path if we seek to define our genera with more precision and to associate only those species under one genus which agree in minuter points of structure. Just this sort of nearer and more critical comparison is what we now evidently need in order

to discuss the question of geographical distribution to any purpose or advantage and to arrive at some nearer comprehension of the way in which species may have differentiated. And it seems reasonable that we should express the results of such comparison in our nomenclature. Not expressing them, their record tends to become obliterated. So that in this direction we find that Jacob Hübner in his work is more nearly up to the requirements of to day than are his critics. And it is only this serious study of Entomology that relieves the whole subject from the charge of childishness which we hear not unfrequently made against it, and which we cannot well otherwise refute. To merely catalogue species of insects is to bring the study of Entomology down to the level of an arrangement of curiosities of any description. It needs some higher spirit to elevate it and to relieve it from the imputation of uselessness.

The second question with regard to Hübner and his works is whether we are to recognize the right of his generic names, proposed so long ago, to be used now for one or more of the species he included under them. It is a question which must be answered in the affirmative under the law of priority, since Hübner is post-Linnean, and wrote on genera from 1806 to 1828.

But it is a question which is confused by technical objections against the form and style of Hübner's generic definitions. Hübner has published two works which we shall here consider (omitting the question as to "Franck's Catalogue" for the time), viz., the Tentamen and the Verzeichniss. The first is a single leaf and contains a sketch of a system of classification in which a number of generic names are proposed and defined by the enumeration of a single known and named species under each. The second is an attempt to classify all the known Lepidoptera of the world under genera very briefly and superficially described.

To the acceptance of these works and the adoption of the generic names therein contained, comes now Mr. W. H. Edwards in the pages of the CANADIAN ENTOMOLOGIST in opposition, and brings with him Dr. Hagen as an ally and one upon whom he depends as full of a knowledge of the literature on the subject. The attack in the March number is mainly on the Tentamen, and we will see what it consists in.

There is mainly brought forward, not without ingenuity, the plea that Hübner never intended that the Tentamen should be adopted. The argument is sustained in two ways. First by the language of the Tentamen; second by the statement that it was not known to contemporary writers on its subject.

As to the first, Hübner's language is that he submits his Tentamen to skilled persons to be examined and pronounced upon. And this sort of language cannot be fairly tortured to mean anything more than that the work was experimental and tentative rather than absolute and final. What otherwise is all work on this subject? Skilled persons will use of any work what seems to them best and useful, without regard to the opinion of the author on his own work. That Hübner's attitude was modest does not authorize us to ignore him, and should rather urge us to examine with the more care what he has written.

The true criticism of the statement that the Tentamen was not known to writers of Hübner's time is more difficult to give, nevertheless we will attempt it. And first we will examine what Mr. W. H. Edwards, seconded by Dr. Hagen, has to say on the subject. We quote from pp. 44 and 45 of the CAN. ENT. their argument as follows:

Ochsenheimer, Schmett. Eur. iv, 1816, says: "Hubner has under the title Tentamen, &c., published on a quarto sheet a sketch of a system of Lepidoptera, in which to the divisions adopted by him are given generic names of unequal value. Hubner seems to be aware of this himself, for he says in concluding, 'let no one suppose that this arrangement will require no farther correction.' *This sheet I saw only long after the printing of my 3rd Vol. was done.*" This was then after 1816, as Ochsenheimer's 3rd Vol. bears date that year. Mr. Scudder has inadvertently copied this as 1st Vol., 1807, instead of 3rd Vol., 1816. So as Dr. Hagen, in a note, says, "the Tentamen was not known to the chief Lepidopterologist of his day for ten years or more after it was printed, though he was in intimate communication with Hubner, and that he did not know it shows clearly that Hubner did not think it of importance enough to be communicated to him."

Now we claim that it is a mistaken criticism of the facts to implicate Ochsenheimer as a party to the ignoring of the Tentamen, and that the onus of this procedure falls on Treitschke, his narrower disciple, and on Boisduval, who wrote of "mon genre" at Hübner's expense. And to do this we have to correct Mr. Edwards' dates. The 3rd Volume of Ochsenheimer bears date 1810, instead of 1816. So that, the Tentamen being issued in 1806, Dr. Hagen's *ten* years is reduced at once to four.

We may admire Dr. Hagen's talent for argument, but it is wide of bringing a true conclusion. The times were not favorable to a rapid interchange of publications, and although this consideration may be insufficient, it is not without its force applied to the four years of 1806—1810. But in order to accept Dr. Hagen's conclusion we have to believe that a man deliberately prints a new system of classification "for the purpose of submitting it" to his fellow naturalists and then inexplicably

"considers it of no importance." That Hübner *did* consider it of importance is shown by his having built the later Verzeichniss upon it. We shall find by careful study that Hübner was a most consistent Entomologist, and the criticism which pronounces him as vacillatory to be worthless. So much is to be plainly gathered from his works themselves.

And, after all, after four years' time Ochsenheimer *does* get the Tentamen, and in his fourth volume, 1816, speaks of it in a manner which shows a desire to adopt what he could of it. His language is both friendly and appreciative, and in his list he quotes it in the synonymy and therein adopts certain of the genera on the authority of the Tentamen, as "*Cosmia*," "*Xylena*," "*Agrotis*," "*Graphiphora*," etc. On the whole he adopts more than he rejects, and where he rejects we are given no reason for the discrimination (e. g. *Heliophila*). But now we can see the value of Mr. W. H. Edwards as a critic. He makes Ochsenheimer to say: "*This sheet I saw only long after the printing of my 3rd Vol. was done,*" and comes to a full stop. *But Ochsenheimer comes to no full stop!* No, he goes on, after a comma, *therefore I could not earlier have adopted anything out of it.** So that Ochsenheimer *apologises* for an unavoidable neglect and in his fourth volume does Hübner a tardy but not altogether inadequate justice. For the names above cited, and others afterwards credited by Ochsenheimer's followers to himself, *are* taken by Ochsenheimer from the Tentamen and credited to Hübner by Ochsenheimer himself. And the criticism that pronounces Ochsenheimer the chief Lepidopterologist of his day we cannot accept. Ochsenheimer was, at best, provincial, and from the nature of his work could not be otherwise. He is not to be compared to Hubner for grasp of his subject. His follower, Treitschke, is still narrower and on him and the school to which he belonged falls the blame for having appropriated, misapplied and ignored the work of Hubner.

A final argument of Dr. Hagen's, that the booksellers of the time did not advertise the Tentamen, may be dismissed with the remark that it certainly was published as proved by Ochsenheimer in 1810, and the question, whether the failure to catalogue a work by a bookseller is sufficient to cancel its publication?

I conclude that if we wish to follow Ochsenheimer we must adopt the Tentamen. I draw attention to the fact that Ochsenheimer's genera

* daher Konnte ich fruher nichts davon aufnehmen, 4, viii.

in the 3rd Volume are equally without diagnosis, and yet have been accepted. It is right here that the struggle has come in between the Hubnerian and Treitschkean ideas as to generic characters in the Lepidoptera. For the time the latter have obtained, and the former have been rejected. But now Hubner's ideas are prevailing, and with them his names will be reinstated in their undoubted right—a right which should not be questioned, for the followers of Treitschke are convicted both of appropriating Hubner's names, and endeavoring to implicate Ochsenheimer after his death in the transaction.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

LAVERNA.

L. ? (Anybia ?) gleditschiœella. N. sp.

The form of the palpi is that of *Anybia langiella* St., as represented *Ins. Brit., v. 3*, but the wings are a little longer than those of *langiella* are there represented, though the hinder pair have the same form. The neuration of the fore wings is that of *L. epilobiella (fig'd loc. cit.)* except that the apical vein is obsolete in the single specimen examined by me; that of the hind wings also resembles that of *epilobiella*: indeed, if the dorsal and submedian veins were represented in the figure of *epilobiella*, and the sub-apical or discal branch was produced forwards into the cell, the neuration would be that of this species. All of the wing veins, except the furcate apical branch of the fore wings, are unusually distinct in this species.

In *Laverna*, however, the species are usually rather coarsely scaled and the wings are usually ornamented with tufts of raised scales, whilst this species is remarkable for the fineness of its scales and its perfect smoothness. But the genus *Laverna* is almost as indefinite as *Gelechia* itself. So far as ornamentation is concerned, this species might be placed in *Asyctina*.

In repose *gleditschiæella* sits very flat upon the surface on which it rests. The ♀ has the last joint of the abdomen long and conical, and the antennae do not quite reach to its apex, while in the ♂ they exactly reach it. The basal joint of the antennae is rather elongate and suddenly clavate, and the stalk is slender and smooth. It seems to walk badly and probably is nocturnal in its habits. It dodges rather clumsily about among the thorns of *Gleditschia triacanthos*, or from a hiding place under one piece of the scaly bark to another, and the larva mines the thorns of the *Gleditschia*.

My attention was first attracted to it by observing numerous empty pupa cases projecting from the large thorns, sometimes two or three from a single thorn, in the latter part of May. As *Gelechia (Helice) palidochrella* Chamb. was swarming around the trunks of the *Gleditschia* trees at the same time, I had little doubt that it was the thorn burrower: however, to make it certain, I gathered some of the thorns, and from them, to my surprise, bred a single specimen of *gleditschiæella*, a "micro" that I had never before seen, though I had captured multitudes of "micros" from the trunks of the same trees. Since then I have taken several specimens by frightening them from their hiding places among the bunches of thorns. I am, however, fully convinced that *palidochrella* also feeds in some way on *Gleditschia*, and I *think* that *Philonome Staintonella* Chamb. most probably does also, and likewise *Semele bifasciella* Chamb. If the latter does not feed on *Gleditschia*, it probably does on Elm.

L. gleditschiæella is dark glossy bronzy brown, tinged also with green in ordinary lights, appearing when the light falls on it golden bronze, in other lights showing purple or even bluish reflections. The anal tuft and rather elongate hairs of the posterior tibiae fulvous in the ♂, but darker in the ♀. *Al. ex.* ½ inch. Kentucky.

An old or worn specimen is a very plain and unattractive insect, but a perfectly fresh specimen is a very fine and handsome one, notwithstanding that it is so nearly unicolorous; its perfect smoothness and gloss, fine scales, elongate wings and ciliae, and rich greenish brown, bronze and purple hues with the changes of light, make it a very handsome species.

The thorns of the *Gleditschia*, after being hollowed out by this larva, are frequently occupied by a small species of Ant.

When the account of this species was first prepared the larva was unknown, and until this spring (1876) I have had no opportunity of investigating its habits. I have found the larvae of two species feeding

upon the pith inside the thorns of *G. triacanthos*; the one first described below I am satisfied is the larva of this species; what the other is I do not attempt to guess, but I append a description of it because of its singular structure.

That which I believe to be the larva of *Gleditschiæella* is about three lines long, rather fat and sluggish, yellowish white, with the head and a line which is interrupted in the middle, across the first segment after the head, just behind its anterior margin, ferruginous. Feet, sixteen. The pupa is not enclosed in a cocoon. I have found a few larvæ and several fresh pupæ in the latter part of April.

The other larva is white, about four lines long, cylindrical, with the segments distinct and clothed with scattered white hairs. The thoracic legs are very distinctly divided into segments, *have no terminal claw*, each segment being surrounded near its apex with a circle of rather stiff ciliæ; the anal feet are small and indistinct, and *there are no ventral prolegs; but there are six pairs of dorsal prolegs or large tubercles* which represent them; these "dorsal prolegs," if I may so call them, are as large and distinct as the true legs: they have no terminal claw, nor any coronet of tentacles, as in ordinary ventral prolegs, but each one is bifid at its tip, or to speak perhaps as correctly, each one ends in two small tubercles, and *progression is mainly effected by these false legs.* In crawling the thoracic and anal feet rest upon one surface, while the dorsal or false feet rest upon the opposite one, the body being curved so as to accomplish this purpose.

The larvæ of *Gleditschiæella* were found in living thorns, or those which had not been long dead; and a single larva evidently eats but little of the pith. The larvæ with the dorsal legs were found at the same time in dead thorns, which had previously been burrowed by the larvæ of *Gleditschiæella*, and in which was the small hole through which the imago of that species had emerged the previous year. No other means of ingress or egress was observed besides this hole, and this singular larva could not now pass through this hole. It was feeding on the dead pith. Small white silken cocoons, between three and four lines long, were found in some thorns; most of them were a year or more old, and were empty, but one of them contained a pupa which unfortunately was destroyed in opening the thorn. Several dead larvæ were also found, but they were so completely encased in multitudes of little Chalcid pupæ that it was impossible to determine the larvæ. A little Chalcid larva was just emerging from one of the larvæ of *Gleditschiæella.*

L. œnotheræsemenella. N. sp.

Antennae white; the basal joint of the outer surface of the second joint of the palpi, an annulus before the middle of the third joint, and its tip, brown (the third joint sometimes entirely brown). Head white. Fore wings sordid whitish, dusted and overlaid with pale fuscous, with four short longitudinal black lines along the middle of the wing, the first of which is on the fold before the basal fourth; the second is about the middle; the third is about the apical fourth, and the fourth is at the apex. These lines are made of raised scales. There are also two blackish raised tufts, one of which is just before the dorsal ciliae, and the other is a little further back. Hind wings fuscous. The first pair of legs is brown on the anterior surface and whitish behind, second and third pair whitish marked externally with brown. The black lines along the middle of the wing remind one somewhat of similar lines in the European *L. phragmitella*, and *L. cephalonthiella* Chamb. has similar lines. This species, however, is quite distinct from both. *Al. ex.* $\frac{7}{16}$ to $\frac{9}{16}$ inch. Sent to me by Miss Murtfeldt, from St. Louis.

(To be Continued.)

ENTOMOLOGICAL CLUB OF THE A. A. A. S.

We desire to call the attention of entomologists of the U. S. and Canada to the fact that the Entomological Club of the American Association for the Advancement of Science will meet at Buffalo, N. Y., on the 22nd of August, in some room that will be provided by the local committee of the Association. All interested in the subject of Entomology are invited to attend, and to repair at first to the Tifft House for instructions.

J. L. LeConte, Pres.
C. V. Riley, Sec.

In view of the fact that questions of great importance relating to the present and future well-being of Entomology are likely to be discussed at the forthcoming meeting of the Entomological Club, we trust that all the "brethren of the net" who can possibly attend from Canada, as well as the U. S., will endeavor to be present.—Ed. C. E.

BOOK NOTICES.

United States Geological Survey of the Territories, Vol. x. Monograph of the Geometrid Moths, by A. S. Packard.

Through the kind recommendation of Dr. Packard, we have been favored with a copy of the above work from the "Department of the Interior," at Washington. It is a quarto volume of over 600 pages, with 13 beautiful plates, 6 of which are devoted to delineations of the wing structure of the different families, 1 to the various forms of thorax, &c., and 6 to representations of the insects in their larval and perfect forms. Some idea of the work on these beautiful plates may be formed when it is stated that these latter six plates contain figures of 377 species of Geometrid Moths, besides 66 figures of the larvæ and chrysalids.

The plates illustrating the venation and external anatomy have been drawn by Mr. S. E. Cassino and Dr. Packard—the moths by Mr. L. Trouvelot, of Cambridge, Mass. They are all well executed, but Mr. Trouvelot's work is especially worthy of praise. The many and minute points of difference between the various species are faithfully given, so that the student, with the help of the excellent written descriptions in the text by Dr. Packard, will have little difficulty in determining the species in his possession.

This work is a most valuable contribution to our Entomological literature, bringing together all that is known up to the present time in relation to the Geometrids inhabiting this country north of the southern boundary of the United States, including British America, Arctic America and Greenland. It will give a great stimulus to the further study of this most interesting family of moths. The careful work of years of patient labor and research is evident throughout its pages, and we sincerely hope that its talented author may be spared many years to continue the work thus so well and thoroughly begun. This volume is beautifully got up—the paper and typography excellent, reflecting great credit on the department from whence it is issued, and on the United States government for their enlightened and liberal policy in thus placing in the hands of the scientific student, as well as that of the general public, the material accumulated by the untiring industry of the busy workers of the past, and diffusing a knowledge throughout the country in reference to these matters which could not otherwise have been accessible.

We tender our cordial thanks to Dr. Packard for his kind remembrance of us.

Eighth Annual Report of the Noxious, Beneficial and other Insects of the State of Missouri, by C. V. Riley, State Entomologist.

We are much indebted to Mr. Riley for a copy of this valuable work. It is got up in the usual excellent style of these Reports, 8vo., 190 p., illustrated with fifty-five excellent wood engravings.

The Report opens with some notes on the Colorado Potato Beetle, followed by articles on Canker Worms, the Army Worm, the Rocky Mountain Locust, the Grape Phylloxera and the Yucca Borer. These articles abound with practical information and suggestions, making the work a very valuable one to the intelligent agriculturist as well as to the entomological student. It would be difficult to estimate the immense good which these eight reports have accomplished, diffusing practical information of the greatest value to the farmer and fruit grower, as well as settling many scientific points of much interest to entomologists. The State of Missouri deserves great credit for her enlightened liberality in supplying the means to enable Mr. Riley to devote himself entirely to this good work, and we believe it will abundantly repay its cost to the State itself in a material way by the saving of grain and fruits from insect destruction, while at the same time it disseminates a knowledge on the subjects treated of over the entire length and breadth of the land.

On Some Insect Deformities, by Dr. H. A. Hagen. Memoirs of the Museum of Comparative Zoology at Harvard College, Cambridge, Mass., 4to 24 p., with one lithograph plate.

Through the kindness of Prof. Agassiz and Dr. Hagen, we have received a copy of the above interesting paper, in which the following subjects are treated of: Perfect Insects with the Larval Head, and Precocious Development of the Caterpillar.

Synonymic List of the Butterflies of America, North of Mexico, by Samuel H. Scudder, Cambridge, Mass., from the Bull. Buf. Soc. Nat. Sci., 8vo., 32 pp.

Fossil Foraminifera of Sumatra, by Henry B. Brady, F.R.S., F.L.S., &c., 8vo., 8 pp., with two excellent lithographic plates. From the Geological Magazine, London, Eng.

The Canadian Entomologist.

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INQUIRIES CONCERNING THE GENERA OF MR. SCUDDER'S "SYSTEMATIC REVISION."

BY S. H. PEABODY, CHICAGO, ILL.

Soon after the issue of the "Systematic Revision," and while I was trying to master the intricacies of its analysis, it occurred to me to tabulate the generic descriptions in some family, if, haply, I might thus discover the exact points of discrimination. By chance I took first the tribe Adolescentes, producing the table which accompanies this paper. In this table, if any expression or word which could distort the obvious meaning of the author, has been omitted or wrested from its proper connection, such change has been through inadvertence or mistake. In like manner I have tabulated the Dryades, the Hamadryades, the Equites, the Voracia, the Fugacia; I confess that when I came to the work of comparing phrase by phrase the five page descriptions of the genera Papilio and Aglais, my heart failed me. I resolved to wait until my unfledged pinions were equal to these lower and briefer flights of the scientific imagination before attempting this more extended journey.

In view of the introductory passages of the "Revision" which promised to remove "the reproach of Lepidopterists," it was with no little concern that I found my tables "insufficient"; that I was unable to distinguish the differences between the genera grouped in the Adolescentes, or the Equites, or the rest. I have waited now nearly four years for some Philip to say "understandest thou what thou readest?" and to give such elucidation that I could go on in joyful belief. No such apostle of the new-antique has appeared, and I venture to offer this table, with a few thoughts, to my entomological brethren.

The analyses of these generic descriptions show two items: First, that many of the differences expressed exist only in the phraseology, either indicating no differences, whatever, in fact, or differences so slight as to be purely opinionative; second, that other differences are such that they

may be positively formulated, often numerically stated. For the present, we will admit that these differences, thus accurately expressed, do really exist, and depend upon measurements which may be repeatedly verified.

With the first of these items we need do little more than present a few illustrations; the array in parallel columns will usually bring them into sufficient prominence. The second is of more consequence, for it raises the important question upon which this whole discussion will turn—Are these differences of such a character as will warrant the erection of distinct genera? Mr. Scudder has already answered this question in the affirmative: for us to answer blankly in the negative would be to pit our opinion against his, in which case the weight of authority would very largely and very properly lie on his side.

We must, therefore, briefly inquire into the distinctions which exist between genera and species, as found in law and in usage.

Probably we can appeal to no higher authority upon the law than that of Agassiz, and accordingly we quote his definitions as found in the "Essay on Classification."

"Genera are most closely allied groups of animals differing neither in form nor in complication of structure, but simply in the ultimate structural peculiarities of some of the parts." Eng. Ed., p. 249.

"Genera [are] characterized by ultimate peculiarities of structure in the parts of the body.

"Species [are] characterized by relations and proportions of parts among themselves, and of the individuals to one another and to the surrounding mediums." P. 265.

Here the question turns upon the force of the words "ultimate structural peculiarities." Can they mean that any difference which can be formulated in the ratio of length to breadth in the same part, or of length of one part to length of another part, is a difference of ultimate structure? If one insect has its fore-tibia five-sixths the length of its fore-femur, while another has the same parts in the ratio of four-sixths, or six-sixths, are they for this cause of different genera? Does this principle extend through zoology? Is Gen. Sheridan, who is short and stout, and who, according to Pres. Lincoln, can scratch his ancle without stooping, generically different from Gen. Sherman, who is tall and slender, and whose ancles are evidently out of his reach? Can any one safely affirm of any individual of any species of any genus in the whole realm of nature, that all its ratios of measurement in all its members are identical

with the corresponding ratios of any other individual existing? There must be a limit to the meaning of these words, or we shall find a genus wherever we find the slightest variation in ultimate structure, that is, a genus for every species, not to say for each individual. An examination of the "Revision" would lead us to suppose that the classification of Butterflies is rapidly drawing to such a condition. When it comes to that, and when each species is the "type" of a distinct genus, what office will remain for genera?

But the other or co-ordinate section of the law distinctly bars this manifestly absurd interpretation of the first section, by making species depend, so far as difference of parts is concerned, upon such differences as involve only the "relations and proportions of parts among themselves." The femero-tibial ratios of five-sixths and six-sixths, for example, are clearly differences of proportion of parts among themselves, and therefore under the law, these differences are not of generic, but only of specific, value.

That this view accords with usage may be abundantly illustrated in every department of Entomology, not forgetting the writings of Mr. Scudder. In a single genus of Coleoptera, lately revised by Dr. Horn, we find assembled species with "thorax broader than long" and "thorax longer than broad"; with antennæ "short" and antennæ "longer than head and thorax"; form "slender," form "broadly oval"; "with wings" and "without wings." In a single genus of Orthoptera Mr. Thomas includes species "with elytra" and "without elytra"; pronotum cylindrical or carinated; antennæ very long or of ordinary length; wings absent or present. In Mr. Scudder's Revision of Crickets will be found tables of measurements of individuals of the same species, in which the ratios differ much more than those in the table of Adolescentes, upon which he bases distinctions of genera. In Dr. Packard's Monograph of the Phalænidæ he includes in the genus Thamnonoma species which have the palpi very long, and palpi short; in Aplodes species which have the first median venule remote from second, and which have the first and second median and posterior discal venules co-originating; in Tephrosia species which have hind tarsi longer than tibia, and hind tarsi shorter than tibia. In the "Revision" itself, Mr. Scudder admits a variation of 41 to 49 joints in the antennæ of different species of the genus Argynnis; it seems, however, that the elastic band which stretches so far would not endure three degrees more of straining to include the antennæ of Speyeria with their 52 joints.

ANALYSIS OF GENERIC DESCRIPTIONS OF THE TRIBE ADOLESCENTES.

Genus.	Lycæides.	Glaucopsyche.	Cyaniris.	Everes.
Head	Small.	Small.	Small.	Small.
Front	Flat. Very slightly tumid beneath; scarcely surpassing front of eyes, fully as broad as they. Scarcely half as high again as broad.	Nearly flat. Below considerably tumid; as broad as the front view of the eyes. Scarcely half as high again as broad.	Flat. Very slightly fullest below; barely surpassing the front of eyes. Scarcely twice as high as broad.	Nearly flat. A very little bulbous below; barely protruding beyond front of eyes. Scarcely ⅔ as broad,&c. Twice as high as broad.
Eyes	Naked.	Delicately and sparsely pilose with very short hairs.	Delicately and sparsely pilose with short hairs.	Naked.
Antennæ	Scarcely longer than abdomen.	Considerably longer than abdomen.	Slightly longer than abdomen.	Barely longer than abdomen.
No. joints in	About 32.	About 31.	About 34.	About 32.
Do. in club.	12 or 13.	12.	12 or 13.	12.

Palpi	Slender. Nearly or quite twice as long as eye.	Slender, compressed. Scarcely more than half as long again as eye.	Slender. Scarcely more than half as long again as eye.	Slender. Less than twice as long as eye.
(as the Nos.	2—)	1½+	1½+	2—)
Ratio of fore tibia to hind	A little more than 5/8.	2/3	A little more than 3/5.	3/4
(as the Nos.	.6¼)	.6⅔)	.6+)	.7½)
Ratio of mid tibia to hind	Scarcely 4/5	3/4	Nearly 5/6	A little shorter.
(as the Nos.	.8—)	.8⅓)	.8⅓—)	.9 or 1.0)
1st Sup'r Br. of subcostal nervure of fore wings arising	In the middle of the outer two-thirds of the upper border of the cell.	Somewhat beyond middle of upper border of the cell.	At scarcely two-thirds the distance from the base to the apex of cell.	A little beyond the middle of the upper border of the cell.
2nd do.	Midway between it and the origin of 1st inferior subcostal nervure.	Midway between this & the origin of first inferior branch.	At less than half way between.	About one-fourth the distance from origin of first to apex of cell.
Cell	Somewhat more than ½ as long as wing.	Somewhat more than ½ as long as wing.	½ as long as wing.	Scarcely ½ as long as wing.

Let us now examine the table of the Adolescentes, searching for these ultimate peculiarities of structure, not simply differences in the proportions of parts among themselves, which furnish the authority for constructing four genera where entomologists have usually found but one.

After observing the sameness in size of head and flatness of front, we meet at once differences which seem to consist in merely varied forms of phraseology. For what else can we make of these? "Front very slightly tumid beneath"; "below considerably tumid," "very slightly fullest below"; "a very little bulbous below." "Scarcely surpassing, barely surpassing, barely protruding beyond the front of the eyes." What may be the relative weight of the four discriminating words "scarcely, considerably, slightly" and "barely," which state how much the antennæ are longer than the abdomen? Does the ascending scale begin with barely and end with considerably? If so, how do we grade the slightly and scarcely? If these words do not express differences, why use them? If they do, is the difference more than a very small difference in the proportion of parts? What shall we say of these phrases which ring the changes upon the devoted fronts of the Equites? They are said to be "scarcely higher than broad," "fully as broad as high," "scarcely broader than high," "of about equal height and breadth," "fully as high as broad." In the Hamadryades we find yet other variations: "Scarcely as broad as," "somewhat narrower than," "not nearly as broad as," "about three-fourths as broad as." Whoever will take the trouble to develop one of these analytical tables will find abundant illustrations of this nature; we believe that Mr. Scudder himself would be surprised at the marvellous facility with which he has escaped saying the same thing twice in the same way.

The numbers of joints in the antennæ scale like a flight of steps. "About 32" must include as possible at least 31 and 33, unless we reckon like that Massachusetts pauper, who being asked how many were there in the poor house, answered "Between eight and nine of us!" Then we have this ladder:

Cyaniris,	33, 34, 35.
Lycæides and Everes,	31, 32, 33.
Glaucopsyche,	30, 31, 32.

The whole range has but four usual and six possible terms.

The palpi are "scarcely more than half as long again as the eye," "less than twice as long as the eye," or "nearly or quite twice as long as the

eye." Is the difference between the first and second of these as great as that between sharp six and flat seven of the musical scale?

The ratios said to exist between the lengths of fore, middle and hind tibiæ, are expressed definitely in numbers. If we reduce the fractions to common denominators in the usual way, that we may compare their numerators, we find the terms so large as to be unweildy. Let us change the fractions to tenths: the resulting numbers are, for ratios of fore tibiæ to hind tibiæ, .6¼+, .6⅔, .6+, and .7½; for middle tibiæ to hind tibiæ, they are .8, .8⅓, .8⅓—, .9 or 1.0—. The entire range of variation is less than one and one-half tenths in the first case, less than two-tenths in the second case. The difference between first and third, first series, is one-fortieth: between first and second is one-twenty-fourth. Are these differences, or even the sum of them, ultimate peculiarities of structure?

One item remains, the venation of the wings. The first superior branch of the subcostal nervure arises "in the middle of the outer two-thirds of the upper border of the cell"—is there any circumlocution in this?—"somewhat beyond the middle of the upper border of the cell," "at scarcely two-thirds the distance from the base to the apex of the cell," "a little beyond the middle of the upper border of the cell. In fractions, ⅔, ½+, ⅔—, ½+.

How, then, does Lycæides differ from another, Glaucopsyche, for instance? 1. Its eyes are naked rather than delicately and sparsely pilose with very short hairs. 2. It has about 32 rather than about 31 joints in its antennae. 3. Its palpi are a little less than twice, rather than a little more than one and a half times, as long as the eye. 4. The ratio of fore tibiae to hind tibiae is $\frac{14}{21}$ rather than $\frac{14}{24}$. 5. That of middle tibiae to hind tibiae is $\frac{16}{21}$ rather than $\frac{16}{24}$. 6. The 1st sup. branch of subcostal nervure arises at $\frac{2}{3}$ rather than at $\frac{5}{7}$ the length of the cell. Upon which of these six points rests the distinction between these genera? Will the integration of all these differentials with whatever may be implied in the shades of meaning between scarcely and barely, considerably and slightly, suffice to make a gross sum which amounts to more than a difference in the proportions of parts properly accounted for as specific? Why may not these find ample room and exact determination in the same genus? Any other of the six pairs which these four names would make, if taken two by two, gives a series of differences of the same nature and of equal weight. The discussion of any other of the tables which lie before us leads to conclusions equally forcible and equally direct. In this resuscitation of

proposed and forgotten genera, this subdividing and limiting of the old and this erection of new, the same method seems to have been followed. There is the same microscopic search for minute differences, the same confusion arising from the use of fractions of different denominators, by which the real amount, or want, of difference evades the understanding, the same felicitous escape from repetition.

If the case is not as we have stated, will some one show wherein? If it is, ought these genera to stand?

Is any genus valid, until it has been substantiated by a full and competent description which shall clearly set forth the points of discrimination between it and other genera, particularly that from which it has been separated?

While the mention of some species in a genus as a type of that genus may be useful as giving a nucleus about which that genus may crystallize, thus providing for future definiteness and fixity, it seems to us that we ought most earnestly to protest against the establishment of a genus by the mere mention of its type. For example, admitting that there is ground for the use of Hübner's name Epargyreus, what is the distinction between it and the proposed new genus Achalarus? It is not enough to answer, perhaps no one is disposed to say, "One skilled in this branch of Entomology will know." The question should be answered for the benefit of the unskilled, the learner. Nor is it enough to say—"We have no space to answer now; we want time for investigation; we will answer hereafter." We believe there are no pre-emption laws in Entomology; that no caveats can be filed at this Patent Office. The laws of priority can cover only so much as one has wrought out and published, not what he gives notice that he expects to find, or intends to publish in the future.

No. of Broods of Danais Archippus.—There positively are three broods of *archippus* here, at *least*. The second is now giving butterflies. I set a female last week and she laid eggs. I saw a chrysalis last week and for several days have seen newly emerged butterflies. The first brood emerged early in June. Very late in the season is a third brood, Sept. or Oct., and these hybernate as butterflies.—W. H. Edwards, W. Virginia.

August 4th, 1876.

DESCRIPTION OF A NEW SATURNIAN.

BY JAMES BEHRENS, SAN FRANCISCO, CAL.

Saturnia (Aglia) Mendocino, n. sp.

The new species is somewhat related to *S. hera*, the brier-feeding Saturnia (*Eglanterina* Bdv.)

Habitat—The forests of Sequoia Sempervirens, of the Coast range of Mendocino County, Cal.

Time of Flight—June, July.

Description from a male—no females as yet taken.

Expanse of wings, 2½ inches ; of body, ¾ inch.

Antennæ of ♂ broadly feathered, of same reddish brown color as anterior wings.

Head darker than wings.

Prothorax with a narrow transversal white band, and this white band lined with an equally narrow black band. Thorax color of anteriors.

Thorax beneath, and legs and feet, of a beautiful cherry red.

Abdomen above dark, with yellow rings, corresponding with color of posterior wings ; beneath colored like feet and thorax beneath.

Anteriors above smoky reddish chocolate. The usual eye, which is small, leans towards the base of wing on a squarish white field, which white does not appear on under side of wings ; the eye itself is distinct below and fully as perfect as above, showing the yellow and blue and black iris. The apex of anteriors colored scarlet (not orange), narrowed in by a slight band of black, which black band is lined on both sides with a faint blue line. No signs of this apical ornament beneath.

Anteriors beneath ochre yellow, nearly as brilliant as posteriors above. Inner margin very dark ; the eye as mentioned previously ; the apex widely obfuscated.

Posteriors above of a bright yellow, marked by the usual eye, same as that of anteriors, but without any white disk or field. A dark obfuscation from the base. A distinct, comparatively broad, black band (with veins slightly marked) towards outer margin, leaving the margin bright yellow. Fringes somewhat deeper shaded, yellow.

Posteriors below unicolorous, of about same reddish fuscous as anteriors above, with but a reflection of the eye or band of upper surface.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Continued).

92. Omophron SAYI Kby. is AMERICANUM Dej.
93. Haliplus impressus Latr., erroneously determined, is RUFICOLLIS De Geer.
94. Hydroporus nigrolineatus Steph. Not known to us. Is the identification correct? *
95. " parallelus Say.
96. " LAEVIS Kby. This and the preceding seem to me to be merely varieties of *catascopium* Say, which Crotch says is GRISEOSTRIATUS De Geer.
97. " PICATUS Kby.
98. " SIMILIS Kby. is IMPRESSOPUNCTATUS Schall. (fide Crotch).
99. Laccophilus BIGUTTATUS Kby. is PROXIMUS Say.
100. Colymbetes SEMIPUNCTATUS Kby. is a GAURODYTES.
101. " BICOLOR Kby. A GAURODYTES.
102. " PHAEOPTERUS Kby. is probably GAURODYTES *obliteratus* Lec.
103. " BIFARIUS Kby. Placed by Crotch in a new genus, ILYBIOSOMA.
104. " RETICULATUS Kby. is probably identical with GAURODYTES ARCTICUS Payk.
105. " PICIPES Kby. is an ILYBIUS.
106. " ASSIMILIS Kby.
107. " TRISERIATUS Kby. is SCULPTILIS Harris.
108. " RUGICOLLIS Kby. is GRAPHODERES LIBERUS Say.
109. " MACCULLOCHII Kby. is ACILIUS MEDIATUS Say.
110. Dytiscus OOLIGBUKII Kby. is CONFLUENS Say.
111. " HARRISII Kby.
112. " FRANKLINII Kby. is CONFLUENS Say, *var.*

* Dr. David Sharp, of Scotland, is now preparing a monograph of the DYTISCIDAE of this world: and by means of typical specimens from Dr, Leconte and myself, will settle definitely the synonymy of all of Kirby's species in this family.

113. Cyclinus ASSIMILIS Kby. is DINEUTUS AMERICANUS Linn.
114. Gyrinus IMPRESSICOLLIS Kby. I think the reference to BOREALIS Aubé is correct.
115. " aeneus Leach (Kby.) Kirby's determination is probably incorrect.
116. " VENTRALIS Kby.
117. " ANALIS Kby. Impossible to identify this species. The name is preoccupied. It is not Say's ANALIS.
118. " minutus Fab.
119. Paederus riparius Fab. (Kby.) is LITTORARIUS Grav.
120. Lathrobium PUNCTICOLLE Kby.
121. " GRAVENHORSTI Kby. is CRYPTOBIUM PALLIPES Nord.
122. " bicolor Grav. is a CRYPTOBIUM.
123. Gyrohypnus ASSIMILIS Kby. is XANTHOLINUS CEPHALUS Say.
124. Olophrum MARGINATUM Kby. is an OMALIUM.
125. Alaeochara PALLITARSIS Kby. is a HOMALOTA.
126. Tachyporus ACUDUCTUS Kby. is COPROPORUS VENTRICULUS Er.
127. " AFFINIS Kby.
128. Philonthus politus Linn. (Kby.) is AENEUS Rossi.
129. " MANDIBULARIS Kby. Male of AENEUS.
130. " PICATUS Kby. is BRUNNEUS Grav.
131. " fulvipes ? Grav.
132. Staphylinus CHRYSURUS Kby. LEISTOTROPHUS CINGULATUS Grav.
133. Creophilus villosus Grav.
134. Necrophorus velutinus Fab. N. TOMENTOSUS Weber is an older name.
135. " HEBES Kby. is a variety of VESPILLOIDES Herbst.
136. " OBSCURUS Kby. is the *Melsheimeri* ‡ Lec.
137. " MELSHEIMERI Kby. Occurs also in Alaska and is *maritima* Mann.
138. " HALLII Kby. is ORBICOLLIS Say.
139. " PYGMAEUS Kby. is VESPILLOIDES Hbst.
140. Necrodes surinamensis Fab. is SILPHA SURINAMENSIS.
141. Oiceoptoma marginale Fab. An older name is SILPHA NOVEBORACENSIS Voet.
142. " lapponicum Linn. is SILPHA LAPPONICA.
143. " TRITUBERCULATUM Kby. is a SILPHA.
144. " inaequale Fab. is SILPHA INAEQUALIS.

NOTES ON GEOMETRIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Endropia serrata Grote & Robinson, Trans. Am. Ent. Soc., p. 88 (July, 1868).

Geometra serrata Drury, Ill., 1, 40, pl. 20, fig. 4 (1770).

Ennomos concisaria Walk., Part xxxv, 1551 (1866).

Endropia serrataria Pack., 517, pl. 12, fig. 25 (1876).

Northern Illinois, June 25, Dr. Wm. A. Nason. This species seems to range from the Eastern and Middle States to Nebraska, according to Dr. Packard.

Lythria chamaechrysaria.

Mellila chamaechrysaria Grote, Bull. Buff. Soc. Nat. Sci., 1, 13, pl. 1, figs. 1–3.

Lythria rilevaria Pack., p. 221, pl. 9, fig. 43.

I do not see any reason for not uniting these species; my illustration has apparently been overlooked by Dr. Packard.

Selenia Kentaria Grote & Robinson, Trans. Am. Ent. Soc., 1, 359, 1865.

Pericallia Kentaria G. & R., iv., 1, 12, figs. 5–6 ♀, 1867.

It is compared by us with the European *Selenia illunaria*, but our material of the latter was erroneously determined, hence the mistake in the generic name afterwards corrected by ourselves.

Tetracis lorata Grote, Proc. Ent. Soc. Phil., 3, 91, 1864.

Dr. Packard has overlooked the original citation to this species.

Lobophora fusifasciata Walk., C. B. M., Part 24, 1258 (1862).

Larentia longipennis Walk., Part 35, p. 1671 (1866).

Scotosia lobophorata Walk., 25, 1347 (1862).

Lobophora vernata Pack., 5th Rep. Peab. Acad. Sci., 57 (1873).

Lobophora vernata Pack., Phal., 183, pl. 8, fig. 13 (1876).

Eupithecia fusifasciata G. & R., Trans. Am. Ent. Soc., 2, 82 (1868).

On my visit to the British Museum specimens of this species were registered under different names, the first of which should, I think, stand for the species.

Lobophora atroliturata Walk., C. B. M., 25, 1710 (1862).

Eupethecia geminata Grote, Proc. Ent. Soc. Phil., 6, 29, pl. 5, fig. 6 (1866).

Lobophora geminata Pack., Phal., 184, Plate 8, fig. 14 (1876).

Eupithecia atroliturata G. & R., Trans. Am. Ent. Soc., 2, 83 (1868).

Fresh specimens are green tinted, when faded become yellow, then probably white as described by Professor Packard, who overlooks, apparently, our synonymical reference based on an examination of the British Museum collection.

Choerodes Gueneé.

This generic name must, I think, stand. The type of *Eutrapela* is the European *lunaria*. The question as to the generic distinction of *clemitaria* does not interfere, for if it is ultimately separated, it must receive a distinct name. Gueneé used *Eutrapela* Hübn. ex. Verz.

The species not referred to *Choerodes* as yet are, apparently, *C. falcata* (Pack.) and *C. fusciferata* (Pack.)

Eutrapela Hübn., Tent.

The type of this genus being the European *lunaria*, our two North American species *Eutr. Kentaria* (G. & R.) and *Eutr. alciphearia* (Walk.) must be referred to it.

Ennomos Treits.

The term *Eugonia* Hübn. is pre-occupied in the butterflies. I had proposed *Eriplatymetra* for *coloradaria* and *angularia*. According to Dr. Packard (I have no specimens) my *coloradaria* is a *Tetracis*.

Eubyja paenulataria (Grote), Proc. Ent. Soc. Phil., 2, 31, pl. 2, fig. 3 (1863).

This species is omitted by Dr. Packard. I think his specimen from Dr. Perley (p. 413) may belong here. I believed to identify the ♂ *E. quernaria* in coll. Mr. Saunders, but have now no specimens of this or *paenulataria* or *cupidaria* to compare.

Endropia Warneri.

Endropia Warneri Harvey, Bull. Buff. Soc. Nat. Sci., 2, 121 (1874).

Endropia apiciaria Pack., Phal., 502, Plate 12, fig. 9 (1876).

It is doubtless by an unintentional oversight that Dr. Packard has re-described this species.

Brotis vulneraria Hübn., Zutr.

A drawing, which I recognize as of this species, has been shown me by Prof. Hinsdale, of Racine, Wis., where the original was taken. Hübner describes the species as from Bahia. I would not refer it to the Geometræ but to the Noctuæ (Fasciatæ).

Plagodis Keutzingi Grote.

Dr. Packard changes the termination of the specific name. I do not think that anything is gained by the addition of *aria* or *ata* to the specific names in this group; and I think there is every reason why the specific name should be left as written by the original author. And why, *in the same genus*, some names should stand with *aria* after them and some with *ata*, I cannot see (e. g. *Semiothisa*). If *Eud. serrata* should have a different termination on account of the pectinated antennae of the male, it should be *serraria*, one would think, and not *serrataria*. Since the limit between feathered and simple antennae is very difficult to draw, the correct application of these terminations is nearly impossible.

NEW NOCTUIDÆ.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Mamestra orobia, n. s.

Eyes hairy; antennæ pectinate. Thorax and wings grayish fuscous, color of *trifolii*: basal half line white, t. a. line geminate, widely separated; t. p. line consisting of a series of white points; subterminal irregular, terminal line black. Orbicular spot large, white ringed with dark centre; reniform constricted at the centre, white margined with a dark filling. Subterminal space shaded light. Beneath of a lighter shade, discal spot and a faint trace of the t. p. line. Secondaries shining fuscous, fringes whitish, beneath lighter, discal spot black, very evident. Expanse 20 m. m. Texas (O. Meske).

This species is allied to *trifolii*. The antennae are pectinate, whilst in *trifolii* they are simple. In *orobia* the darker costal edge shows the white dots distinctly.

Gortyna appassionata, *n. s.*

Antennæ simple, base white. Thorax and wings of a dark red color, thorax tufted, basal half line yellow, 3-shaped, enclosing one large and one small yellow spot; exterior to the line a white dot. T. a. line inaugurated by a yellow dot on the costa, irregular, broken yellow; t. p. line geminate, inaugurated same as t. a. line, regularly waved; s. t. line faintly marked. Orbicular nearly round, white; reniform ovate, broken into many white spots by the red stains on the veins, with two perpendicular lines making a centre filled with yellow. Claviform subquadrate, bi-lobed, white, red margined; median space between the spots concolorous, below bright yellow, broken into subquadrate spots by the narrow median shade line and the red stained veins; terminal space glistening red, subterminal space wide, concolorous purple. The ground color appears as yellow spots in the median space near the costa; fringes concolorous. Beneath lighter than above, glistening, the arcuated line apparent in both wings; inferior wings pale, fuscous stained, with purplish fringes concolorous. Expanse 35 m. m. London (E. B. Reed).

Perhaps the most brilliantly marked species of the genus. It is allied to *nitela*, differs from it by the wider, rounder reniform, the three larger superposed spots on the t. a. line, the wider concolorous subterminal space and the more regular lunulate t. p. line.

Homoptera stylobata, *n. s.*

Costal margin straight; wings slightly dentate. Fore wings blackish shaded with whitish on the t. a. line and on median space behind over the reniform. Lines black, distinct, perpendicular, t. p. line squarely exserted opposite the cell around the reniform. An interrupted black line before the margin. Fringes cut with whitish opposite the interspaces. Hind wings blackish with obsolete lines: the dotted line before the margin continued. Fringes mostly whitish. Beneath grayish with double distinct common blackish shade bands. Abdomen stout, tufted. Expanse 39–40 m. m. Texas (Belfrage, No. 170). Several examples.

Homoptera mima, *n. s.*

Allied to the preceding, but smaller, without the whitish shades on fore wings. Reniform with a few white scales. Lines black; sinuate

t. p. line distinct, even, exserted opposite the cell. Hind wings pale, ashen, with median line and ashen fringes; fore wings with blackish fringe, narrowly cut with pale. Beneath yellow, whitish, black speckled, with common line and black discal points. Expanse 33 m. m. Texas (Belfrage, No. 73). One specimen.

These two species differ by their nearly entire wings and by the obsolescent markings on hind wings, which do not agree with the primaries as strongly as usual. I do not see differences on which to separate them generically.

NEW PYRALIDES.

(II).

BY A. R. GROTE, BUFFALO, N. Y.

Emprepes novalis, n. s.

Fore wings whitish yellow and olive brown. The median field whitish yellow except a costal blotch of the darker tint. Base narrowly whitish yellow, succeeded by an oblique olive brown band. The outer line bordering the median space is nearly upright, a little irregular and slightly notched opposite the cell and again at internal margin. It is followed by the broad olive brown subterminal space. The subterminal line is yellowish, brought near the margin, flexuous, and the veinlets on the terminal space are marked with yellowish. Hind wings unicolorous fuscous. Beneath the terminal portion of both wings is fuscous, neatly and evenly limited from the pale basal portions. Legs pale; thorax somewhat yellowish. Expanse 16 mil. Texas (Belfrage, No. 403, Oct. 7); Bastrop Co. (Mr. Meske); Zeller, No. 385.

Botis octonalis.

Orobaena octonalis Zell., Beitr., 2, 11, Taf. iii, fig. 7.

Botis sexmaculalis Grote, Can. Ent., 8.

Texas (Boll in Mus. C. Z.) Kansas, Prof. Snow. The maxillary palpi are stated by Zeller to be probably wanting and the location of the species uncertain. I have only a single imperfect specimen before me.

The palpal structure is said by Prof. Zeller to be like that of *Orobaena*. I do not know any of the species which the Professor includes under that generic name.

Mesographe stramentalis Hübn., Zell. Beitr., 1, 74.

This species and its varieties are described by Prof. Zeller, l. c., who considers the European and American specimens to belong to one species. It is not rare in New York State. I have it from Long Island (Tepper); Albany (Lintner); Buffalo. Perhaps this is the *Pionea cunusalis* of Mr. Walker.

Mesographe rimosalis.

Pionea rimosalis Guen., 371.

Taken by myself in Alabama. One specimen (No. 2) sent me by Mr. Fred. Tepper, from Long Island.

Eurycreon sticticalis (Linn.)

Algonquin, Illinois, June 16, Dr. Wm. A. Nason. A specimen sent to Prof. Zeller could not be distinguished by him from the European species.

Zinckenia perspectalis (Hübn.)

New York State and Texas (Belfrage, No. 401, Nov. 22).

Mochlocera Zeller (n. g.)

♂. Eyes naked; antennæ ciliate beneath, brush-like; labial palpi curved upwards across the front, pointed; two very long, thickly scaled rigid processes extend from the base of the antennæ for about one-half the length of these latter, ascending from the inside of the scape and widening towards their tips, where they are heavily scaled. These processes might be taken for the labial palpi at first sight. The neuration has not been examined. I have seen three male specimens. The genus is allied to *Tetralopha* Zell.

Mochlocera Zelleri, n. s.

Fore wings divided into three fields by the median lines. Inner line defining outwardly the blackish basal space, black, with a slight median notch, nearly perpendicular, followed by a white shade. Median space shaded with white, with a short black discal streak. Outer line very finely denticulate, exserted opposite the cell, arising at apical third, black, run-

ning inwardly below median vein and narrowing the median space thence to internal margin. Terminally the wing is black. A broken black line at base of fringe. Hind wings blackish. Beneath pale blackish with common shade band and black point on disc of hind wings. Expanse 25 mil. Texas (Belfrage, No. 420, April 30); Zeller (No. 378 *mihi*); Missouri (Prof. Riley, No. 69).

Zophodia dentata Grote.

I have described this species in a paper prepared for Prof. Hayden's Reports. It is larger than *Bollii* Zell., and is at once distinguished and sufficiently characterized by the very deeply and acutely dentate outer line of the fore wings, which arises near the apices and sweeps inwardly to the discal point, thence in a succession of acute and deep inflections accompanied by gray or whitish shades. The species is more blackish than the Texan, the interior line single and more widely produced. One specimen from Clear Creek Canon, Colorado.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

LAVERNA.

L. bifasciella. N. sp.

Palpi with the outer surface of the second joint dark bluish brown or blackish, dusted sparsely with white, the inner surface being white dusted with blackish scales; third joint blackish. Head and tongue white, the vertex with a faint purplish tinge, and dusted with dark brown. Thorax very pale ochreous and white, dusted with blackish scales, and with the anterior margin shining black. Antennae dark brown, the basal joint somewhat silvery towards the tip. Primaries dark brown, in some lights bluish black dusted with white, and the dorsal margin with some dark dusting, from the base to the last fascia, which is just before the ciliae; the base is white faintly tinged with pale ochreous; a little before the

middle is a rather wide fascia of white and dark brown scales mixed, the dark brown hue prevailing near the costa, where the white is very narrow, while the white prevails towards the white dorsal margin; there is an obliquely transverse spot or ridge of raised dark scales about the middle of the wing, beginning on the costa and margined before with white, and before the ciliae is an oblique white fascia nearest the base on the costal margin. Ciliae of a sordid hue, dusted with white. *Al. ex.* ⅝ inch. Received from Mr. Behrens, of San Francisco, Cal.

L. unifasciella. N. sp.

Allied to *L. Murtfeldtella* Chamb. and the preceding species, and to *L. propinquella* Stainton, but still more nearly to *L. decorella* Steph. The single specimen before me has the palpi broken off.

Head white dusted with purplish brown scales on the vertex, and all the brown parts of the insect have something of a bluish or purplish gloss. Antennæ brown. Upper surface of the thorax brown anteriorly, passing backwards into white at the apex. Fore wings brown dusted with white scales, the white increasing in quantity in the apical part of the wing. There is a large white spot on the base of the dorsal margin, as in *Murtfeldtella* and *propinquella*, not quite crossing the wing, and separated, as in those species, from the white spot placed a little further back, which in *decorella* is connected with the spot at the base; this and the absence of the white spot within the costal margin, are the most obvious points in which this species differs from *decorella*. Behind the basal white spot in this species is an ochreous streak in the brown and which ends at the second white spot or patch, which, as just stated, is continuous with the basal one in *decorella*; this white spot nearly crosses the wing in this species, but does not quite reach the costa, and is dusted with brown and contains on the fold a short dark brown line of raised scales, as in *decorella*, and which is bordered on the costal side by a small ochreous spot; thence to the fascia the wing is dusted with white scales and streaked about the fold with ochreous. The white fascia is placed just before the ciliæ as in *decorella*, and is oblique, being nearer to the base on the dorsal than on the costal margin, and before it the wing is more dusted with white and not so strongly marked with ochreous as in *decorella*, and so it likewise is behind the fascia, though both before and behind the fascia there is a distinct small ochreous spot or streak within the dorsal margin. There is a row of dark brown spots around the apex. (This *may* represent a hinder marginal line, as the ciliæ are injured.)

Abdomen brown on the upper surface, the under surface and tuft silvery whitish. Legs brown, tarsi annulate with white. *Al. ex.* 3/8 inch. Behrens, San Francisco.

NEPTICULA.

N. badiocapitella. N. sp.

Vertex rusty or reddish brown; face a little paler or more reddish; palpi silvery; eye caps silvery white; antennae brown. Thorax and patagia white. Fore wings dark iron gray with a white fascia about the middle, the fascia irregularly outlined and wider on the dorsal than on the costal margin: at about the apical fourth are a costal and opposite dorsal white spot, distinct and rather large, which are sometimes faintly connected or nearly so, forming a linear fascia deeply concave towards the base; ciliae white; legs yellowish, except the anterior surface of the first pair, and the outer surface of the hind tibiae; abdomen bluish fuscous. *Al. ex.* 1/6 inch. Kentucky in June. It is a rather coarsely scaled and distinctly marked species.

(To be Continued.)

CORRESPONDENCE.

Dear Sir,—

I enclose a few words from Prof. P. O. Zeller, to whom I had sent a copy of my paper on the Tentamen, showing his utter condemnation of the present effort of a few of our lepidopterists to resuscitate Hübner. His letter is dated Grünhoff, 23 June, 1876. . . . "I know Scudder's work concerning the Generic Names of Butterflies, and I could not say wherein I do not agree with your verdict upon the same. Since that miserable, worthless Tentamen is such a foundation for Scudder's theory, he will consider himself unfortunate in having mistaken the date of its publication. . . . The Tentamen was printed, not in 1806, but in 1805. . . . Why not leave Hübner's birds and butterflies to sleep quietly in the grave? Since he has disturbed them, they will be shoo'd around for a while, let us hope as uselessly as the Tentamen."

Yours,

W. H. Edwards.

Coalburgh, 21 July, 1876.

The Canadian Entomologist.

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FARTHER NOTES UPON ARGYNNIS MYRINA.

BY W. H. EDWARDS, COALBURGH, W. VA.

In Vol. vii, Oct., 1875, I gave some account of my breeding *myrina* from eggs laid in July, 1875. I am able now to supplement this by the history of an earlier brood. My observations were made last year at Hunter, in the Catskill Mountains, and being at the same place in June of the present year, from 17th June to 1st July, I found this species abundant, and from the rubbed appearance of nearly all the individuals taken by me, I inferred that they had emerged at latest early in June. On the 19th I set two females on violet, in a gauze bag. On the 20th there were several eggs laid. The first butterfly from this lot emerged 15th July, but in their early stages these larvæ were not in my keeping, as I mailed them to Coalburgh. Other females gave eggs on 27th June; the larvæ hatched 3rd July. These I kept by me and brought to Coalburgh, following their changes carefully. The 1st moult occurred July 7th, the 2nd July 10th, the 3rd July 12th, the 4th on 15th; chrysalis on 18th; and the butterfly emerged 23rd July; 26 days from the laying of the egg. This is the history of half a dozen out of the fifty odd of the brood. The others were less regular in their changes, and the last two butterflies emerged 31st July, or 33 days from the egg. There were but four moults, and I was in error in stating last year that the species moulted five times. A remarkable proportion of the butterflies were females, at least four out of five. The first eleven which emerged were all females, and so were several of the last.

I turned the butterflies of this brood loose as they appeared, with the exception of three, hoping to naturalize the species here. They scattered up and down the valley at considerable distances as I occasionally discovered, but I rarely saw one within my grounds. On dissecting one of the three reserved, the abdomen was found filled with nearly mature

eggs. All these larvæ of both lots proceeded to chrysalis, none of them becoming lethargic, as do larvæ of many species of butterflies in their summer broods.

Early on 27th of July I turned out 12 *myrina*, which had emerged from chrysalis since the previous evening, and about nine o'clock I observed a pair in copulation in the grass near my house. They were perfectly quiet and I was able to examine the female carefully to see if there was any abrasion of scales on thorax above, or on the wings. She was perfect and I have no doubt was one of those turned loose that morning. Passing along an hour later, and seeing this pair still in the same spot, I placed the inner edge of my net gently by the female, and she immediately climbed up, dragging the male after her. From the net they were easily transferred to a box and left in quiet. At 7 p. m. they had not separated. By 6 next morning they had, and I at once set the female on a plant of violet, under a bag. Within an hour several eggs were laid on the leaves, and within 48 hours many more had been laid on the leaves and the bag, when I let the insect fly. I counted 93 eggs in all. I had noticed that the freshest possible females of *tharos* and of *nŷcteis* lay eggs readily on being shut up with their food plants, and the same thing with *Papilio ajax*, but hardly supposed the whole process was quite so rapid as in the present case. These eggs gave larvæ 4th and 5th of August, and the butterflies from them will again lay the eggs for the hybernating larvæ which will go to make the June brood of next year. Of this last brood of the year I as yet know nothing from observation. Whether the larvæ hybernate when half grown, as do the larvæ of many *Melitæas*, or as soon as hatched from the egg, as do the larvæ of *cybele* and other species of *Argynnis*, remains to be discovered.

In 1875, the eggs laid between 20th and 25th July produced butterflies by 3rd September. The eggs laid by the female 28th July, 1876, produces a corresponding brood with those of July, 1875, just mentioned. And this brood is the aestival of Scudder. But it should be called the autumnal, and the mid-brood, the butterflies of which have emerged between 15th and 31st July, as stated, the aestival, the early brood from hybernating larvæ being the vernal.

Description of Preparatory Stages of A. Myrina:

EGG—conoidal, slightly rounded at base, truncated and rounded at summit; marked by 14 (or about) thin vertical ridges, which are somewhat wavy, and mostly extend from base to summit, not quite meeting

about the depressed micropyle; some of these ridges anastomose near the top, others lower, on the sides; the spaces between the ridges roundly excavated and crossed by fine striæ.

YOUNG LARVA—Length, .08 inch; cylindrical, slightly tapering posteriorly, deeply creased at the junction of the segments; color pale green, but brown patches nearly cover segments 5, 7, 9 and 11; furnished with rows of tubercles from which spring black hairs, which are long and curved forwards; head obovate, a little broader than 2nd segment, pilose, brownish black.

After 1st moult, length .2 inch; grayish mottled with brown; armed with 6 rows of short, stout, black spines, which have short black bristles; feet and legs blackish; head cordate, smaller than second segment, pilose, black.

After 2nd moult, length .3 inch; cinereous mottled with black, the spines as before; at the base and on outer side of the spines of the 1st lateral row, on the 3rd, 5th, 7th, 9th and 11th segments, a yellow patch; head as before.

After 3rd moult, length .6 inch; cinereous brown, mottled with darker in small patches; a pale black dorsal line, enlarged on each segment into a rounded spot; the yellow patches as before, but rather orange than yellow; spines longer, those of 2nd segment decidedly so, being between two and three times as long as any others and projected forward over the head; head as before, bronze color.

After FOURTH MOULT and MATURE—Length 1 inch; color cinereous brown, mottled with velvet black, there being a large patch at the base of each spine of the two dorsal rows, and which is edged with a pale color; spines long, tapering, irregular, honey-yellow, often orange at base, with black bristles; those on 2nd segment about 3½ times as long as any others and porrected; legs and feet black; head cordate, with rounded vertices, with black bristles over surface; color bronze.

CHRYSALIS—Length .6 inch; compressed laterally throughout; the wing cases very prominent and flaring at base; the head case not much flattened, its vertices prominent, conical, the intervening space being roundly excavated; the mesonotum prominent, sharply compressed, followed by a deep excavation; on the dorsum two rows of sharp, conical tubercles, those on 7th segment much larger than the others, and all anterior to these two gilded; the two tubercles at head case also large, umber colored; color light brown, the wing cases streaked with darker; or the whole surface is a dark brown.

A SYNONYM OF ANISOPTERYX POMETARIA.

BY B. PICKMAN MANN, CAMBRIDGE, MASS.

In Dr. Packard's Monograph of the Phalænidæ, just issued, the name *Anisopteryx autumnata* is substituted for that of *A. pometaria*, on the ground that the name *A. pometaria* is a synonym of *A. vernata*, and I am quoted as subscribing to the latter proposition. I acknowledge that in Proc. Bost. Soc. Nat. Hist., xv, 382, I applied the name *A. pometaria* to that species which was subsequently shown to be *A. vernata*, but it was at the same time that I applied the name *A. vernata* to that species which I should now call *A. pometaria*, and which Dr. Packard calls *A. autumnata;* I therefore have maintained throughout that the names belong to entirely different species. I have endeavored, in Proc. Bost. Soc. Nat. Hist., xvi, 207, and verbally, to show that these names are not synonyms, and have succeeded so far that after Mr. Morrison had re-named *pometaria*, and was ready to publish his name, he withdrew it ; after Mr. Riley had published a statement that *pometaria* Harris was not *pometaria* Mann,* he published another,† saying that it was. I had made the same mistake previously, which I now attribute to Dr. Packard, but I had not expected to find it made again after it had been corrected so many times.

Quite aside from the question of fact whether Harris did describe the autumn species as *pometaria* or not, there could be no question that I believed it, and that my writings should be so interpreted. I was surprised, therefore, to find my description of the monstrous female of "*A. pometaria* Harr., descr.," quoted under *A. vernata*, especially with a foot note stating explicitly that *vernata* was not intended.

My article in Proc. Bost. Soc. Nat. Hist., xvi, 163, which treats entirely of *pometaria* according to my understanding, is cited by Dr. Packard under both species.

I would therefore correct Dr. Packard's Monograph, p. 402, by erasing lines 13 to 16, 20, 21, 25, and putting *pometaria* in place of *autumnata* wherever it occurs in connection with these species. Moreover, the monstrous female of *pometaria* had four aborted wings, not two, as Dr. Packard states.

* Sixth Mo. Rep., p. 29.

† Seventh Mo. Rep., p. 80.

NOTES ON CERTAIN VARIATIONS OF SAMIA CECROPIA.

BY C. E. WORTHINGTON, CHICAGO, ILL.

The deceptive effect of the variable border on the apparent shape of the primary wings in *Samia cecropia* appears to have escaped general notice; indeed, in contrasting this species with *S. promethea*, the latter is universally mentioned as having the primaries much broader in proportion to the length. This is perhaps true of the average *cecropia*, but in numerous individuals I have found primaries even broader in proportion than in *S. promethea* ♀, and narrower than in *promethea* ♂, both by traced outlines and shadow projections, in several instances those with a wide light border appearing extremely narrow but proving to be even broader than the average.

This effect also extends to the so-called sexual difference in the wings, the margin usually being broader and lighter and the apical patch more brilliant in the males.

A careful comparison of a considerable number of specimens shows that no reliance can be placed on the breadth as a sexual character, and that even the antennæ (especially of those fed on *Negundo fraxifolium*) sometimes approach so nearly as to be barely distinguishable.

There are strongly marked variations in the apical patch outside of the ≒ line, generally indicated by a purplish reflection, but sometimes brighter; occasionally above, and more frequently below, being a dull red or a brilliant crimson; more rarely over-running the line inwardly; the four black spots immediately inside of the zigzag line are often reduced to two, those nearest the apex being obsolete.

The discal spots vary greatly in color: normally dull red with a white centre, they are sometimes entirely red with no trace of white; in others they will be found almost white with merely a shade of red or pale brown about the margin, and at the sharp end, where color is always present, their shape varies from that of a pear to a long, curved (crescent-shaped) line or a short straight mark, rarely so small as to be almost obsolete.

Usually at the base of the primaries is a dull red spot, surrounded by a black and white line, and at the base of secondaries a prominent white patch extending along the upper margin; in the first either black or white may be wanting, while the latter, so far as regards the base of the wing, is

occasionally either entirely wanting or existing as a continuation of the margin of the basal patch on primaries; on the upper margin the shade appears to be constant, although sometimes obscured so as to appear a dull gray.

Similar variations are observable in the abdomen, vermillion and white, red, black and white, and rarely dark brown and white (the color of the wings); and in the wings, which may be dark brown sprinkled slightly with gray, and opaque or dull black, and semi-transparent; one specimen in my collection, with the primaries of the first and secondaries of the latter color, presented a curious appearance; this was one of two taken from *Ampelopsis quinquefolia*, the other having both wings thin and silky, and nearly as black as *Papilio asterias*. The palpi usually agree with the body, as do the legs; in this case both are dark red.

Notwithstanding these differences and the wide range in size (4⅛ to 7¼ inches being the extremes of perfect moths in my possession), *cecropia* agrees so well in general appearance that, aside from the black variety mentioned above, a distinctly marked variety is a rarity, the nearest approach I have seen being in four ♂ moths from cocoons found on rose bushes, in which nearly all the space on the primaries between the basal spot and the border, is finely flushed with red, which grows fainter outwardly, the same red flush being continued down the abdominal margin of secondaries, giving the entire moth a reddish hue; the occurrence of red on the primaries is not extremely rare, but I have never seen others than these with red on the secondaries, except in the border.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Continued).

145. Oiceoptoma americanum Linn. has been known by the ante-Linnean name of *peltata*.

146. " TERMINATUM Kby. is a variety of the preceding.

147. " AFFINE Kby., variety of 145.

148. " CANADENSE Kby., variety of 145.

149. Peltis ferruginea Linn.
150. Nitidula obscura Fab.
151. " OSSIUM Kby., same as 150.
152. " discoidea Fab. Subsequently described as OMOSITA *inversa* Lec., from California.
153. Ips DEJEANII Kby. is VITTATUS Say.
154. Choleva SPENCIANA Kby. is a CATOPS.
155. SCAPHIUM CASTANIPES Kby. is very rare. Occurs also in the White Mts., N. H.
156. Leiodes PUNCTATOSTRIATUS Kby. is *Anisotoma indistincta* Lec.
157. Corticaria DENTICULATA Kby. The name is preoccupied and was changed to *Kirbyi* Lec. It is probably DELETUS Mann.
158. Atomaria atra Steph. (Kby.) Incorrectly determined by Kirby and is probably a dark variety of LAETULA Lec.
159. Cryptophagus HUMERALIS Kby. is a TRIPHYLLUS, and is *ruficornis* Lec.
160. " CONCOLOR Kby. A variety of the preceding.
161. Attagenus CYLINDRICUS Kby. Belongs to a new genus, PERIMEGATOMA Horn. Trans. Am. Ent. Soc., 1875, p. 135.
162. " pellio Linn.
163. Dermestes lardarius Linn.
164. " DISSECTOR Kby. is NUBILUS Say.
165. Byrrhus PICIPES Kby. Name is preoccupied and is now KIRBYI Lec.
166. " CONCOLOR Kby. Now known to us. Is not a variety of *Cytilus varius* Fab., but appears to be a small CYCLOPHORUS Kby.
167. " CYCLOPHORUS Kby.
168. " varius Fab. This is an erroneous determination. The species is CYTILUS TRIVITTATUS Mels.
169. Hydrobius fuscipes Linn.
170. " marginellus Fab. Probably an erroneous determination and may be PHILHYDRUS FIMBRIATUS Mels.
171. " melanocephalus Ol. An erroneous determination and is PHILHYDRUS PERPLEXUS Lec. I have specimens from Mr. Pettit which correspond with Kirby's description of both the above species.
172. Hister PAYKULII Kby. is DEPURATOR Say.

173. Hister HARRISII Kby.
174. Onthophagus latebrosus Fab. is HECATE Panz.
175. " SCABRICOLLIS Kby. is JANUS Panz.
176. Trox arenarius Fab. (Kby.) This may be AEQUALIS Say.
177. Pelidnota punctata Linn.
178. Camptorhina ATRACAPILLA Kby. is SERICA VESPERTINA Schonh.
179. Diplotaxis TRISTIS Kby.
180. Rhizotrogus fervens Gyll. (Kby.) is LACHNOSTERNA FUSCA Fröhl.
181. " DRAKII Kby. A race of 180.
182. Dichelonycha BACKII Kby.
183. " VIRESCENS Kby. is ELONGATULA Schonh. Variety C is SUBVITTATA Lec.
184. " TESTACEA Kby.
185. Cetonia fulgida Fab. is EURYOMIA FULG.
186. Trichius BIGSBII Kby. is GNORIMUS MACULOSUS Kn.
187. " ASSIMILIS Kby. is AFFINIS Gory.
188. " ROTUNDICOLLIS Kby. is PIGER Fab.
189. " VIRIDANS Kby. is AFFINIS Gory.
190. Gymnodus FOVEATUS Kby. ♂
191. " RUGOSUS Kby. ♀ is OSMODERMA SCABRA Beauv.
192. Platycerus piceus Weber (Kby.) is erroneously determined and is DEPRESSUS Lec.
193. Passalus interruptus Linn. (Kby.) is CORNUTUS Fab.
194. Campylus DENTICORNIS Kby.
195. Pedetes BRIGHTWELLI Kby. is an ATHOUS.
196. " (Asaphes) RUFICORNIS Kby. is ASAPHES MEMNONIUS Hbst.
197. Perimecus fulvipes Hbst. (Kby.) is MELANOTUS CASTANIPES Payk.
198. " communis Gyll. is also a MELANOTUS.
199. " SIMILIS Kby. A MELANOTUS, but the synonymy is unknown.
200. Ctenicerus KENDALLI Kby. is CORYMBITES VIRENS Schr.
201. Elater AERIPENNIS Kby. is a CORYMBITES.
202. Buprestis RUSTICORUM Kby. is a variety of MACULIVENTRIS Say.
203. " PAGANORUM Kby. is 202.
204. " NUTTALLI Kby.
205. " lineata Fab.
206. " fasciata Fab.
207. " divaricata Say is a DICERCA.
208. " TENEBROSA Kby. is a DICERCA.

209. Buprestis TENEBRICA Kby. may be the same as DICERCA *lugubris* Lec.
210. " TRINERVIA Kby. is a CHRYSOBOTHRIS.
211. " PROXIMA Kby. is CHRYSOBOTHRIS SCABRIPENNIS Lap. et Gory.
212. " DRUMMONDII Kby. is a MELANOPHILA.
213. " umbellatarum Fab. (Kby.) is erroneously determined and is ANTHAXIA INORNATA Rand.
214. " appendiculata Fab. (Kby.) is erroneously determined and is MELANOPHILA LONGIPES Say.
215. Agrilus BIVITTATUS Kby. is BILINEATUS Weber.
216. Trachys AURULENTA Kby. is BRACHYS OVATA Weber.
217. " ACUDUCTA Kby. Mr. E. Saunders (Trans. Ent. Soc., London, 1868, p. 60) says this is a CISSEIS and from Australia.
218. Pytho NIGER Kby.
219. " AMERICANA Kby.
220. Trogosita AMERICANA Kby. is probably *corticalis* Mels.
221. Monochamus RESUTOR Kby. is SCUTELLATUS Say.
222. " CONFUSOR Kby.
223. " MARMORATOR Kby. is probably that variety of SCUTELLATUS Say, called *Oregonensis* Lec.
224. Acanthocinus (Graphisurus) PUSILLUS Kby. is now called GRAPHISURUS PUSILLUS Kby.
225. Callidium AGRESTE Kby. is a CRIOCEPHALUS.
226. " striatum Linn. (Kby.) is ASEMUM MOESTUM Hald.
227. " COLLARE Kby. is now GONOCALLUS COLLARIS.
228. " PROTEUS Kby. is now MERIUM PROTEUS.
229. " SIMILE Kby. is 228.
230. " DIMIDIATUM Kby. is a PHYMATODES.
231. " (Tetropium) CINNAMOPTERUM Kby. is known as a TETROPIUM.
232. Clytus UNDATUS Kby. is XYLOTRECHUS UNDULATUS Say.
233. " LUNULATUS Kby. is the same.
234. " FUSCUS Kby. A variety of the same.
235. " LONGIPES Kby. is a NEOCLYTUS.
236. " MURICATULUS Kby. is a NEOCLYTUS and has since been described as *leucozonus* Lap.
237. Hargium lineatum Ol. is a RHAGIUM.

238. Pachyta LITURATA Kby.
239. Leptura CHRYSOCOMA Kby.
240. " SUBPUBESCENS Kby. is PROXIMA Say.
241. " ERYTHROPTERA Kby. Variety of 242.
242. " canadensis Ol.
243. " TENUIOR Kby. is TYPOCERUS VELUTINUS Ol.
244. " BREVIS Kby. is L. VAGANS Ol.
245. " sexmaculata Linn.
246. " SEMIVITTATA Kby. is L. VITTATA Ol.
247. " GULOSA Kby. is also L. VITTATA Ol.
248. " SUBARGENTATA Kby.
249. " SIMILIS Kby. is *rufibasis* Lec.
250. " LONGICORNIS Kby. is ACMAEOPS *marginalis* Lec.
251. " PROTEUS Kby. is an ACMAEOPS.
252. " LONGICEPS Kby. is ACMAEOPS PRATENSIS Laich.
253. Anobium FOVEATUM Kby. is a HADROBREGMUS.
254. Cis micans Fab. (Kby.) Unknown; seems to be CHEVROLATII Mell.
255. Tomicus pini Say.
256. Apate BIVITTATA Kby. is a XYLOTERES.
257. " RUFITARSIS Kby. is a XYLOTERES unknown to us.
258. " (Lepisomus) RUFIPENNIS Kby. is a POLYGRAPHUS.
259. " (Lepisomus) NIGRICEPS Kby. Probably the same as 258.
260. " (Lepisomus) BREVICORNIS Kby. Unknown.
261. Hylurgus RUFIPENNIS Kby. is a DENDROCTONUS.
262. Calandra pertinax Ol. is a SPHENOPHORUS.
263. Hylobius CONFUSUS Kby.
264. Lepyrus colon Linn.
265. " GEMELLUS Kby.
266. Cleonis VITTATUS Kby. is CLEONUS.
267. MACROPS MACULICOLLIS Kby.
268. " VITTICOLLIS Kby.
269. LEPIDOPHORUS LINEATICOLLIS Kby.
270. Trachyphloeus MELANOTHRIX Kby. Constitutes, with a California species, a new genus, GEODERCES Horn.
271. Pachyrhynchus SCHONHERRI Kby. is ITHYCERUS NOVEBORACENSIS Forst.
272. Attelabus SIMILIS Kby. is ANALIS Illig.
273. " bipustulatus Fabr.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ASYCHNA.

A. ? pulvella. N. sp.

This species is placed in this genus provisionally. It is certainly not a true *Asychna*. Indeed, almost the only character common to all the species which Mr. Stainton places in this genus is their ornamentation, and in this respect *Laverna ? gleditschiaella* is an *Asychna*, whilst this species is far from it. This species *(pulvella)* differs widely enough from all the others in ornamentation; but structurally it approaches this genus so nearly that rather than construct a new one for it, I place it here provisionally. Taking for comparison Mr. Stainton's figures in Ins. Brit., v. 3, the wings of *pulvella* resemble those of *A. æratella* more nearly than any of the other species. They are, however, more narrow and elongate; the dorsal margin of the fore wings is nearly straight, while the costal curves down to it nearly as in *A. modestella* reversed: that is, the costal of *modestella* represents the dorsal of *pulvella*, and the dorsal of *modestella* is a little more curved than the costal of *pulvella*. The neuration is exactly as in *æratella*, except that the cell is unclosed in the fore wings and in the hind wings *pulvella* has one more branch of the median vein (placed between the second and third of *æratella*), and continued through the cell. The palpi are more like those of *A. terminella*. The antennæ are slender, longer than the body, and shorter than the wings. Its attitude in repose resembles that of *Bedellia somnulentella*, to which it bears some resemblance in coloration.

Head, palpi, antennæ, thorax and fore wings whitish, but so densely dusted with ochreous brown as to obscure the ground color: the antennæ are faintly annulate with whitish, with three large white annulations before their tip, which is also white; the second and third of these annulations are intermediate between the first and the tip. The fore wings have a brown streak along the fold and another further back on the disc, and a small white spot at the end of the cell. The ciliæ are grey, those of the apex dusted with ochreous brown. Upper surface of the abdomen of the general hue; beneath it is paler and the anal tuft is silvery white. Legs of the general hue, the tarsi annulate with white and the first pair brownish on their anterior surfaces. *Alar. ex.* $\frac{5}{8}$ inch. Kentucky in June.

ELACHISTA.

E. ? cristatella. N. sp.

This insect, of which I have but a single captured specimen, (in good condition, however,) in its depressed head and its forehead rather acutely angulated, as well as in the size and appearance of the antennae, reminds one strongly of *Acaca ostryæella* Chamb., as it does also in the ornamentation. As, however, *Acaca* is near *Elachista*, and the palpi in this specimen are more elongate and slender than in *Acaca*, and I have not examined the neuration, I place it provisionally in *Elachista*.

Head and face white; the palpi iron gray mixed with white. Antennæ brown. Thorax and wings dark iron gray dusted with white; just before the middle the white dusting forms an indistinct line across the wing, faintly indicating a fascia which is margined on the dorsal edge of the wing by a small raised dark brown tuft. The under surface of the thorax and abdomen and the basal joints of the legs are silvery yellowish, the tibiae and tarsi dark brown on their outer surfaces and annulate at the joints with white, and the anal tuft is silvery. *Al. ex.* scant ¼ inch. Kentucky in June.

COLEOPHORA.

C. nigralineella. N. sp.

Second joint of the palpi with a minute tuft at the apex beneath, and basal joint of the antennae with scales projecting in front.

Palpi (except the whitish inner surface), head, thorax and fore wings ochreous; basal two-thirds of the antennae with alternate annulations of white and brown; the apical third slender and white. Hind wings and upper surface of the abdomen brownish slate color, with two short longitudinal blackish lines on top of each abdominal segment, except the last two, and which are very distinct in fresh specimens, but less so in dry ones; under surface of abdomen and anal tuft yellowish silvery; ciliae of both pairs of wings yellowish ochreous, a little paler than the ground color of the fore wings; anterior surface of the fore legs brownish. *Al. ex.* not quite ½ inch. Kentucky; captured in July, and I have in a single instance bred it from a somewhat pistol-formed case which was found attached to a leaf stem of the Black Walnut (*Juglans nigra*). The case is yellow with pistol *handle* brown, except on its under side, where it is white, and there is a triangular projection on top of the *barrel* near the muzzle, by which it was attached to the stem.

GELECHIA.

G. Clemensella. N. sp.

Second joint of palpi much larger than third, and somewhat brush-like.

Deep roseate with a pale purplish lustre (or perhaps pale ochreous red will be as accurate). The palpi have a dark brown annulus at the base of the third joint and another before its tip; some of the scales are tipped with hoary, and the head, thorax and wings are dusted with dark brown scales, which are aggregated into small specks and spots and are denser in the apical than in the basal half of the wing; the brown spots are more distinct along the costa than elsewhere, and are there equally distinct on the under side; there are three or four small white spots on the disc, and an irregular, not very distinct, white fascia beginning on the dorsal margin near the base, but not extending entirely across the wing. Ciliae of the general hue. *Al. ex.* ¾ inch. Received from Mr. W. H. Stultz, of Easton, Pennsylvania, the former residence of Dr. Clemens, who does not seem to have known the species; at least he has not described it, though it appears to resemble *G. salicifungicida* in some respects.

G. Saundersella. N. sp.

Palpi simple; third joint nearly as long as second, brown; the tip of the second joint, an annulus about the middle of the third and its tip pale creamy yellow. Head creamy yellow dusted with blackish; thorax blackish tipped with pale creamy yellow; fore wings pale creamy yellow densely dusted with blackish scales beneath the fold; a blackish spot on the base of the costal margin, another about the basal fourth on the costal margin, which is not distinctly separated from one placed obliquely behind which touches the fold; another on the costal margin just behind the middle, behind and beneath which is another just above the end of the fold, and the apical part of the wing very densely dusted with blackish; ciliae of the general hue, with a dark brown hinder marginal line (or row of blackish specks) at their base. Hind wings rather deeply emarginate beneath the tip and pale slate color; abdomen pale yellowish tinged with fuscous; anal tuft pale yellowish. Antennæ annulate with pale creamy yellow and blackish. First two pairs of legs dark brown, the tarsi annulate with creamy yellow; hind legs creamy yellow, marked with dark brown or blackish spots. *Al. ex.* a little over ¼ inch. Kentucky in July. I have named this rather pretty little species for the editor of the CANADIAN ENTOMOLOGIST.

ON FOUR NEW CALIFORNIAN HEPIALI.

BY JAMES BEHRENS, SAN FRANCISCO, CAL.

The species described in this paper are from Mendocino. The genus seems to be more numerously represented on the West than on the East Coast of North America. Some of the new forms resemble the European. To none of these species can I refer Dr. Boisduval's descriptions of *hectoides* or *californicus*.

Hepialus sequoiolus, *n. s.*

Three specimens. Primaries light brown with five darker, black margined, interrupted bands marked on costa by separated spots, the fourth, just before apex, slightly furcate. The terminal or outer band is extended along the veins to the outer margin, interspaceally lunate. From the median fold to internal margin the first band is composed of silvery white united spots, preceding the second band, which is powdered with black and shows inwardly an ochre line. Between the third and fourth bands below vein 5 to internal margin, runs a similar white and narrower band. There is a basal white dash, above which a blackish shading. Hind wings blackish, with fringes and costal margin marked with brown. Beneath the fore wings are marked with pale brown on costa and reflect partially the bands of upper surface. Thorax camel's hair brown, with the abdomen perhaps paler. *Expanse* 37 to 40 mil.

A single specimen differs by its increased size and the absence of the white bands; else, while paler colored, it seems to agree. I am undecided about the value of this form at the present writing.

Hepialus mendocinolus, *n. s.*

Five specimens. Allied to the preceding and to *ganna* of Europe, but tinged with reddish and more unicolorous and smaller. The darker bands are obsolete in three specimens. In *ganna* the white bands are often connected and the outer one runs from the apex. In this species the white bands are more oblique, parallel, and obtain over the primaries below the cell. A white dash at base connected with the first white band. The brown of the thorax shows a pink tinge and the blackish hind wings are pinkish on the fringes. *Expanse* 32 to 35 mil.

The white bands occupy the same position as in *sequoiolus*, but I do not think it is a form of that species, although eventually it may be found the same.

Hepialus Baroni, n. s.

Four specimens. A distinct species, with concolorous primaries on which the bands are hardly legible. In the best marked specimens they are gray, while the wings are tinged with dull red. The third and fourth bands are fused, and the outer edge of the fourth band is even and marked. At first sight there is little visible except the broader, extra-basal, curved gray band, and the band beyond the cell which I call the fourth. There is a subterminal, narrower, or fifth band. Thorax and hind wings blackish tinged with dull red. *Expanse* 32 to 48 mil.

Named for Mr. Baron, of Mendocino, with whom I have spent some pleasant days in the collection of Lepidoptera. Specimens vary much in size.

Hepialus Lenzi, n. s.

Six specimens. The smallest species and the brightest colored. The ground color is blackish and there is a very bright red tinge on the fringes, costa and the bands. Of these but two are visible, ochre in color, margined with bright red; the outer furcate superiorly, the inner rounded, and limiting outwardly the paler base of the wing. The hairs of the thorax have a bright red tinge; the abdomen is more yellowish brown. The blackish hind wings have yellowish fringes. Beneath the legs are tinged with very bright red, and so also is the costal margin of the wings. *Expanse* 25 to 27 mil.

This pretty species I name after Professor Henry Lenz, Curator of the Lubeck Museum.

In conclusion, I express my obligations to Prof. A. R. Grote, Director of the Museum of the Buffalo Society of Natural Sciences, for an examination of my types and his opinion on the same.

After examining my type of *Saturnia mendocino*, described in the ENTOMOLOGIST, Prof. Grote considers it a true *Saturnia*, and points out that in its yellow hind wings it resembles the European *S. carpini* ♂, while it differs from the European species of the genus by the obsolescence of the lines, the concolorous wings and the reduction of the ocellate marks in size.

MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

In accordance with previous announcement, the members of the Entomological Club met on Tuesday, the 22nd of August, at 2 : 30 p. m., in the rooms of the Buffalo Society of Natural Sciences, Dr. LeConte in the chair. The following members were present : Dr. John L. LeConte, Philadelphia, President : S. H. Scudder, Cambridge, Mass., Vice-Pres't ; C. V. Riley, St. Louis, Mo., Secretary ; J. A. Lintner, Albany, N. Y.; Dr. H. Hagen, Cambridge, Mass.: Dr. John G. Morris, Baltimore, Md.; B. P. Mann, Cambridge, Mass.; W. Saunders, London, Ont.; Rev. C. J. S. Bethune, Port Hope, Ont.; E. B. Reed, London, Ont.; A. R. Grote, M. M. Maycock, Dr. L. F. Harvey, Henry S. Sprague, O. Reinecke, W. W. Stewart, of Buffalo, and others.

PRESIDENT'S ADDRESS.

After calling the meeting to order, the President read the following address :—

In resuming the chair, which by your kind partiality I occupied at the last meeting of the club, permit me, after thanking you for the honor you have done me in thus calling me a second time to this position, to congratulate you on the evidence of increased interest felt in the branch of Zoology to which we give our attention.

This increased interest is shown not only by the larger attendance at the present meeting of Entomologists from distant residences, but by the increase of correspondence between those who collect and study insects. I have received during the year several applications from new correspondents for advice and assistance in the study of Coleoptera ; and my colleague, Dr. Horn, informs me that the same is the case with himself. Unfortunately I have been obliged to reply to some of the applicants with a temporary negative, as my time has been almost wholly taken up with efforts to complete my memoir on Rhynchophora, now in course of publication by the American Philosophical Society. This memoir would have been finished some weeks ago, but the exceptional inclemency of the summer heat rendered all work with lenses difficult and uncertain. I think I may promise that the MSS. will be complete in a few weeks. Meanwhile I am glad to say that the arrangement of my cabinet specimens is so far perfected that Dr. Horn or I will be willing to name any sets of

Rhyncophora of the United States or Dominion of Canada, which are sent us, provided that the return of the specimens sent is not required. The subject has been such an extremely troublesome one, and there are still so many uniques in our cabinets, that they need filling up in order to give them that value for future reference which I hope they will possess, and it will also be desirable for the proper recognition of the new genera and species, many of which are very abundant, that specimens should be distributed to foreigners, who have studied this difficult group of objects.

The excellent volume of Dr. A. S. Packard, jr., "Monograph of the Geometrid Moths of the United States," forming Vol. X of the United States Geological Survey of the Territories, requires special mention among the contributions to Entomology since our last meeting. We owe the existence of this volume to the enlightened policy of Dr. F. V. Hayden, Geologist-in-Chief of the Survey, and I hope that a continued appreciation by the National Legislature of the importance of the work done and published by the Survey, will ensure us many future volumes of similar merit.

The ordinary routine work of the description of new genera and species, is going on in the various orders of insects with about the usual degree of rapidity. But from every one comes the same complaint: Too many new forms to be described!

The observations on economic applications of Entomology for the protection of agriculture are also advancing in a most commendable manner, considering that the public and their servants in office still fail to recognize the magnitude of the interests involved.

References to the memoirs contained in the volumes of reports, and to isolated papers in agricultural and other journals, will be found in *Psyche*, a periodical, which, though small, is indispensable to every one occupied in the study of the insects of North America.

I would gladly stop here, but a truthful instinct, a sense of duty to science, and my obligation to you alike forbid silence. I have to speak of a subject of a disagreeable nature.

It is concerning the efforts made by you and other members of the Association at the last meeting at Detroit, to procure the appointment of a Commission for the protection of agriculture against noxious insects: this Commission to be composed of properly informed men of science, and chosen under such circumstances as would prevent the influence of political bias, or personal favoritism. If I do not fatigue your memory too much, you will recollect the memorials that were so extensively signed

in relation to this subject, copies of which memorials are again before you. These memorials were extensively circulated at the West, and were signed by many of the most influential bodies for the promotion and protection of agriculture in that region. During the winter these memorials were sent to Congress, in the expectation that some proper legislation would follow. One of the Senators, in fact, introduced a bill which seems to have been very carefully considered, and indeed bears upon its face some evidence of scientific guidance. This bill provided for the appointment of three Commissioners for five years, the Commissioners to be nominated by the Council of the National Academy of Science to the Secretary of Interior. This bill, having been referred to the Committee on Agriculture, was returned, completely orchidized, in such form as to provide for one Commissioner, to be appointed by the Department of Agriculture, the very enemy and incubus from which the western agriculturist specially desired to be relieved.

The bill in this form passed the Senate, several of the members taking occasion in the discussion which preceded the passage to talk to the demonstration of their own ignorance of the subject. However, this discussion has been already so severely commented upon in several of the newspapers of the Mississippi Valley, that it is quite unnecessary for me to add anything farther, except the hope that the Legislature which choose the successors of those Senators will have men of better education and higher intelligence offered to them as candidates for the position.

I regret to have been obliged to introduce this unpleasant subject, about which I feel a warmth and severity, unsuited to the position in which you have placed me. I must therefore close by begging you, in your respective localities, to continue aiding me in my endeavor to cause the Government authorities to give proper attention to this most important subject.

The minutes of the last meeting held in Detroit were read by the Secretary, C. V. Riley, and approved.

The consideration of reports of committees was postponed, owing to the non-arrival of some of the members.

Mr. Riley made some remarks upon the variation in the venation of the wings of *Anisopteryx pometaria* (or *A. autumnata*), and exhibited mounted preparations of wings of this insect differing greatly from the figures in Dr. Packard's new work.

Mr. Grote considered the variation of neuration in the Geometridæ as of no great value as a specific distinction.

Mr. Riley said that he had scarcely ever raised a large number of forms from the egg without finding that in the imago state there appeared to be more than one so-called species. Whenever he used large quantities of material he found this result. He thought, therefore, that writers when describing species should always state the number of specimens they had before them.

Dr. Hagen then read a valuable paper "On Genera," at the conclusion of which he was warmly applauded. This paper will appear in next issue.

On motion of Mr. Grote, the report of the Committee on Nomenclature was then taken up, when Mr. Riley read a majority report of the Committee.

Mr. Scudder did not approve of the course taken in reference to the rules on nomenclature which had been presented, and thought that members of the committee had exceeded their instructions, and desired that the resolution passed at the last meeting, appointing the committee and defining its duties, be read. He thought that the opinions of leading naturalists on this subject should have been gathered and compared.

The resolution giving instructions to the committee was read as follows: "That the Club appoint a committee of five to prepare and present to the Club at its next annual meeting a compendium of the views of the leading Entomologists of the country upon points which, in their judgement, require elucidation, and also to present a series of resolutions touching such points, in order that intelligent discussion may be had upon them and some general agreement, if possible, arrived at."

Mr. Riley urged as reasons why a majority report had been presented, the difficulty of getting the members of the committee together, and the urgent necessity that some action should be taken in the matter without further delay.

Mr. Saunders supported these views, and urged that the opinions of many of the leading Entomologists on the subject of nomenclature had been given in the pages of the CANADIAN ENTOMOLOGIST during the past year, while others had expressed their views by letter to members of the committee; and seeing that there had been no opportunity for the committee to meet together as a whole, he thought it desirable that these resolutions, which had been endorsed by a majority, should be presented as a guide to the discussions which might take place on the subject.

Mr. Scudder did not think this a proper time or place for the introduction of such rules; he fully agreed, however, that it was very desirable to establish stability in nomenclature.

Mr. Mann regarded Mr. Scudder's remarks as a motion to set aside these rules, and as such was prepared to support it.

Dr. Hagen, in a few words, gave a sketch of the history of nomenclature, showing how tidal waves of new names had been poured from time to time on the Entomological world with the greatest zeal on the part of those who had introduced them; that in many instances these changes were unnecessary and produced confusion instead of establishing order. He thought it highly necessary that some understanding should be arrived at among Entomologists which would lead to greater stability in nomenclature.

Mr. E. B. Reed spoke for those who had comparatively little time to devote to Entomology, and thought that they were a class who should be considered, and that while it was perhaps no great task for those who devoted their whole time to Entomological studies to master the great number of new generic and specific names from time to time introduced, it was imposing a burden on their less fortunate brethren which was grievous to be borne, which was, in fact, more than they could bear, and tended to discourage many and deter others from entering on the study of Entomology. He urged that it was from among the ranks of these beginners that some of the future leaders of Entomological science would be drawn, and it was well to consider what effect these discouraging circumstances would have on the present and future progress of the study.

After some further discussion, the resolutions were referred back to the committee to report on to-morrow. Meanwhile they were ordered to be printed for the members, so that discussion could be had upon them.

EVENING SESSION.

At 7.30 the meeting was again called to order, the President in the chair.

Mr. Riley offered some remarks on a parasite, a mite which attacked the Colorado Potato Beetle. This insect (of which mounted specimens for microscopic examination were submitted) is furnished with a strange and extraordinary development of what he supposed were the maxillæ, by which it was able to attach itself to the Doryphora, and at the same time extract nourishment as well. He thought it was an organ somewhat similar in character to the extensile maxillæ of the larvæ of Dragon Flies.

Mr. Scudder thought that since they appeared to him to be jointed they must be a palpus of some sort.

Dr. LeConte, after further examination, was of opinion that they were not jointed.

(To be Continued.)

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MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Concluded from September No.)

Mr. Scudder then read an interesting paper on "Mimicry in Butterflies explained by Natural Selection," quoting largely from a recent contribution by Fritz Muller on this subject, in which he gives the results of observations made by him on butterflies in Southern Brazil. This paper will appear in *Psyche*, the organ of the Cambridge Entomological Club.

Mr. Riley gave the result of some observations on the eggs of *Corydalis cornutus*, from which it would appear that the mass of eggs hitherto regarded as belonging to this species are probably those of a *Belostoma*. He had found in one day thirty or forty patches of eggs which he believed to be those of *Corydalis cornutus* on the leaves of trees whose branches overhung the water. These flat patches were very strangely arranged and contained an immense number of eggs, often numbering between three and four thousand in a patch. The eggs are at first translucent, but become darker as they approach maturity, when the young larvæ break through the eggs beneath.

Dr. Morris doubted whether these really were the eggs of *C. cornutus*, and questioned whether the larva was aquatic at all.

Dr. Hagen thought that there was something strange in reference to these insects. Mr. Riley had kindly sent him a large number of eggs, but when hatched he had failed in every attempt to keep the young larvæ alive. Since they are furnished with both branchia and stigmata, he thought they must be regarded as water insects.

Mr. Lintner had found the larvæ under stones, but when they enter the chrysalis state they make their way into the water, and in this condition they are often captured in large numbers and used as fish bait.

Mr. Riley said that the larvæ in Missouri are frequently found in water, and he had no doubt but that the eggs he had referred to were those of *Corydalis cornutus*.

Mr. Scudder stated that Mr. Sanborn had frequently taken large numbers of the larvæ in the water in the neighborhood of Cambridge.

Mr. Saunders had never found them in the water, but had frequently captured them buried in moist sand or under stones along the banks of rivers.

Mr. Riley next exhibited to the Club some silken masses containing eggs of *Hydrophilus triangularis*, which were very remarkable and interesting.

Mr. Saunders offered some remarks on a mass of pupæ and escaping insects of *Calopteron reticulatum*, which he found one morning early in summer at the roots of some long grass. The mass was fully as large as a hen's egg, and must have contained some hundreds of individuals. A large number of the freshly escaped insects were captured with a view to ascertain whether there was much variation in the markings and whether the form *terminalis*, which is said to be a variety of *reticulatum*, could be found among them. He saw none approaching this latter form—all were well marked specimens of *reticulatum*.

Dr. LeConte mentioned the curious fact that in some species of *Calopteron* the larval skin was not shed when it pupated, but that the larva skin and pupa skin both remained *in situ* until the perfect insect escaped.

Dr. Morris then made some interesting remarks on the mouth parts of the woodpeckers.

Mr. Riley exhibited specimens of blown larvæ very nicely set up ; he thinks, however, that in this condition they are scarcely of value for scientific study, and for this purpose prefers the specimens preserved in alcohol.

Mr. Scudder differed from Mr. Riley, and thinks that the advantages are in favor of the blown specimens, and much prefers to study larvæ in this way.

Dr. Hagen agreed with Mr. Scudder that blown larvæ were advantageous for study.

Dr. Morris asked if any of the gentlemen present who were in the habit of raising larvæ, had made any observations in reference to the length of time the development of the perfect insect may be retarded.

He stated that three or four years since he had placed a number of cocoons of *S. cynthia* on a shelf in his house, and that after lying there all that time some of them had this year produced the perfect insect.

Dr. Hagen referred to an instance related by Kirby & Spence where a beetle, *Buprestis splendida*, was ascertained to have existed in the wood of a pine table more than twenty years (7th edition, p. 121).

Mr. Saunders mentioned the fact that the perfect insect of *Œanthus niveus* frequently came to sugar at night, when they were readily captured. He thought that where they were very numerous this method of trapping them might be employed with advantage.

Mr. Lintner observed that he had taken 16 species of *Catocala* at sugar this season, and that a friend of his who has been sugaring industriously has found the *Catocalas* to be most abundant about midnight.

On the 24th another meeting of the Club was held at 2 p. m., the President in the chair.

The Committee on Nomenclature, consisting of Dr. LeConte, S. H. Scudder, A. R. Grote, C. V. Riley and W. Saunders, reported a set of rules, on some of which they were unanimous, while on others there was a divided opinion. They had given all the attention to the subject possible within the limited time at their disposal, but had not found time to consider the explanations offered in the majority report presented, and suggested that these be referred back to the Committee with power to print such explanations as may be agreed on with the rules.

The following are the rules submitted :

1. The binominal system, as originated by Linnæus, is the only one to be recognized. The use of a third word, however, connected with the second by a hyphen, as is common and desirable in the case of gall insects, *e. g.*, *Cynips quercus-palustris*, is not to be considered as an infraction of this rule. (Unanimous.)

2. Where a specific name has been generally adopted during a period of twenty years, such name shall not be changed for one of prior date. (Divided opinion.)

3. The name placed after a genus should be that of the author who established the genus in the sense in which it is actually used, but the name of the author who first proposed the term should be cited in brackets. (Unanimous.)

4. No generic or specific name should be acknowledged which has not been printed in a published work. (Unanimous.)

5. A generic name, when once established, should never be cancelled in any subsequent subdivision of the group, but retained in a restricted sense for one of the constituent portions of the original genus. (Unanimous.)

6. In constructing family names they should end in *idæ*. (Divided opinion.)

7. The tribe should occupy an intermediate place between the subfamily and genus. (Unanimous.)

8. The authority for the species and not for the generic combination should follow the name of an insect. (Divided opinion.)

9. The proposition of a genus by simple designation of a type is to be greatly deprecated. All new names should be accompanied by ample definitions that will permit no doubt as to the species intended or as to the characters of the genus proposed. (Unanimous.)

10. No description should be made from a figure. (Unanimous.)

11. The number of individuals upon which either a specific or generic diagnosis is based should always be stated. (Unanimous.)

After a lengthy discussion, on motion of Mr. E. B. Reed, the following resolution was unanimously passed :

That the report of the committee be adopted, and that any rules on which this committee have expressed a divided opinion have a marginal note attached thereto, reciting such fact.

It was also resolved that all the explanations, &c., offered in the majority report be referred back to the committee with power to print such explanations as may be agreed on, with the rules.

Moved by Rev. C. J. S. Bethune, seconded by S. H. Scudder—That no alteration or addition to the rules now adopted be made, unless such alteration or addition be proposed at one annual meeting of the Club, and be adopted at a subsequent annual meeting. Carried unanimously.

The election of officers for the ensuing year then took place, resulting as follows: President, Dr. LeConte; Vice-President, S. H. Scudder; Secretary, C. V. Riley.

Mr. Scudder brought to the notice of the members a pattern insect box, which he believed to be pest-proof. These boxes are exceedingly

well made (manufacturers, Hancock & Greeley, Cambridgeport, Mass.), are about 19 x 15 in., and are sold at $2.70 each, without cork.

Mr. Saunders suggested the desirability of the Club appointing a permanent committee to whom disputed points in reference to Entomological matters might be referred. On motion of Mr. Mann, seconded by Mr. Saunders, it was resolved that the Permanent Committee of the Club shall consist of the President, as chairman, and four other members to be named by him.

Mr. Lintner presented to the meeting a very complete and extensive list of insects taken at sugar by him during the present season. These were arranged in a tabular form in a very neat and methodical manner, showing at a glance the insects taken each evening, and whether they were abundant or scarce.

On motion of Mr. Riley, Dr. Larkin was requested to bring before the Club some facts in reference to a mite said to be parasitic on the human subject, when he read a very amusing letter from an afflicted patient in reference to this matter. The Club then adjourned.

LARVA OF ANAPHORA AGROTIPENNELLA.

BY MISS MARY E. MURTFELDT, KIRKWOOD, ST. LOUIS, MO.

In Vol. 4, p. 137, of the CANADIAN ENTOMOLOGIST, Mr. Grote first published a description of the large and characteristic Tineid above named. The imago has been very common with us for several years, but until the present season its larval history had eluded my investigation.

Early in April I found among the roots of a bit of white clover sod a very active and singular larva, whose long and rather sprangling thoracic legs gave it, at first glance, the appearance of a Coleopterous larva. A second look, however, discovered the characteristics of a Lepidopteron of which the following description was taken :

Length, 0.75 inch. : diameter greatest at head and 1st joint, slightly tapering thence posteriorly. Incisions quite deep. Color a dark purple brown, the general surface dull, having the appearance of very fine

stippling, but variegated with conspicuous, slightly elevated, polished spots, eight on each thoracic, and ten on each abdominal joint. The anal segment and the one immediately preceding it lighter in color than the others, and somewhat translucent. Head horizontal, broad and thick, of a highly polished black color, the triangular face outlined by a fine line of brown. Basal joint of antennæ transparent, 2nd joint tipped with black, terminal joint entirely black. Maxillæ similar. Thoracic legs unusually long, black, except at the joints, where they are translucent cinereous. Venter and prolegs—the latter only moderately developed—of a translucent smoky brown, the anal pair variegated with irregular patches of opaque dark brown.

This larva was placed in a large jar partially filled with earth, and from time to time the clover sod was renewed; but I saw nothing more of it until about the 1st of May, when, thinking it to be dead, I was proceeding to sift the earth in the jar. My attention was soon attracted by a long string of webby matter in the soil, which I at first supposed was some sort of fungus growth, although remarkably tough and strong for anything of that kind. As I was pulling it to pieces, a shining black head was suddenly protruded from one end, and I at once recognized the missing larva. The webby substance proved to be a silken gallery, white and smooth inside, which constituted the concealed retreat of this interesting little creature. The gallery has an open entrance at the surface of the ground, from which its inmate emerges at night to feed. A little pressure from below forced the larva from its hiding place, and I was enabled to observe that it had increased in size, the length being about one inch with a diameter of 0.15 inch. at the 1st joint; the color was also a shade lighter than when my description was taken; otherwise it was unchanged.

June 16th I carefully unearthed the gallery a second time, and found it to be nearly six inches in length, descending by irregular windings to the bottom of the jar, two and one-half inches. About mid-way reposed the insect in the pupa state. The chrysalis is slender, elongate, the abdominal segments sharply edged, but not serrated, and of a mahogany brown color. The palpal sheaths are conspicuous, extending down on the ventral side as far as those of the antennæ. June 29th the moth issued, and I was delighted that it proved to be the species of *Anaphora* whose larval habits I had long desired to ascertain.

LIST OF CATOCALÆ OBSERVED IN THE VICINITY OF CINCINNATI, OHIO, 1876.

BY CHARLES DURY, CINCINNATI, O.

Catocala Schrank.

Group 1—Secondaries black without bands:

Viduata Guen., the largest black-winged species; rare; 3 taken in 10 years.

Lacrymosa Guen., rather common this season, but only 1 seen in 10 years before.

Desperata Guen., not rare.

Retecta Grote, not abundant.

Robinsonii Grote, not abundant; occurs in fall only.

Levettei Grote (= Judith Streck.), rare; occurs in early summer.

Epione Drury, abundant; in early summer comes freely to sugar, sometimes before dark.

Tristis Edwards, very rare; the smallest black-winged species; only one specimen seen.

Obscura Strecker, abundant.

Flebilis Grote, not abundant.

Insolabilis Guen., rare previous to 1872; now abundant.

Var. Residua Grote, not abundant.

Group 2—Secondaries red with black bands:

Cara Guen., abundant; 150 taken this summer.

Amatrix Hüb., abundant.

Ilia Cram., abundant; very variable.

Innubens Guen., abundant.

Var. Scintillans Grote, not rare; this species may properly belong in Group 3; reared on Walnut.

Ultronia Hüb., abundant.

Marmorata Edwards, rare: one specimen of this princely colored species taken this summer.

Parta Guen., abundant; reared on Willow.

Coccinata Grote, rare.

Unijuga Walk., not abundant; appears late; one specimen taken October 6th.

Group 3—Secondaries yellow with black bands or band :

Neogama Guen., abundant ; reared on Walnut.
Subnata Grote, not rare.
Piatrix Grote, abundant.
Palaeogama Guen., very abundant.
Var. Phalanga Grote, not abundant.
Habilis Grote, not abundant.
Serena Edwards, not abundant.
Nebulosa Edwards, not rare in 1874.
Cerogama Guen., rare.
Illecta Walk., rare ; taken in July feeding on blossoms of *Catalpa.*
Grynea Cram., abundant ; appears early.
Minuta Edwards, not abundant.
Polygama Guen., not rare.
Var. Mira Grote, not abundant.
Var. Pretiosa Lintner, not abundant.
Fratercula G. & R., rare ; one specimen taken.
Androphila Guen., not abundant.
Var. Lineella Grote, not abundant.

Forty Species and Varieties.

NOTES ON NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Segetia fidicularia Morr.

This species, which I have referred to *Caradrina* and as a synonym of *C. multifera* Walk., in the Check List, seems to me identical with the European *Caradrina cubicularis* S. V. A single European specimen of the latter has the common line beneath more extended, the hind wings whiter (♂'s compared) ; these characters are not, I think, likely to be constant. There are no other differences. I have a single poor Cali-

fornian specimen which may belong here. On page 13 of my Check List I would then make the following correction :

456. cubicularis *(S. V.)*

Segetia fidicularia Morrison.
? Caradrina multifera Walker.

Caradrina flavimaculata Harvey.

I have examined Dr. Harvey's type and a second Californian specimen. I regard both as extreme varieties of *Laphygma frugiperda* (Abb. & Sm.) In the Californian specimens the fore wings are dusty grey, pale, with only the stigmata obscure yellowish. This name, bearing the No. 1114 in my Check List, must then be referred to No. 358 among the synonymy.

Hadena interna Grote.

I find on a nearer comparison that this name is founded on a very dark specimen of *H. delicata* Grote, wanting the green shading on the reniform, costal region and subterminal line, which characterizes fresh specimens of *delicata*. The name, which is numbered 274 in my Check List, must then be referred as a synonym to No. 269.

Ipimorpha subvexa, n. s.

♂. This species is of an olive fuscous gray and resembles in color the European *subtusa*, but is very much larger and wants the claviform. The external pale margin to this spot is to be perceived in *plexectusa;* this is not indicated in *subvexa*, which also has the orbicular much reduced. The t. p. line shows no bending on the subterminal fold, and it is slightly more outwardly rounded opposite the cell than in either of the allied species. The median yellowish lines are accompanied by dark edging as in the European *subtusa*. The s. t. line is accompanied by quite heavy preceding darker shading. Terminal line dotted, blackish. There is a faint median shade below the reniform. The basal-half line and t. a. line are further apart on costa than in *plexectusa*. The stigmata are disproportionate, owing to the small size of the orbicular, which is much smaller than in *subtusa*. Hind wings fuscous with pale costal region and pale, faintly interlined fringes. Thorax and abdomen above olivaceous fuscous, concolorous with primaries. The t. a. line seems to show a faint notch on median vein.

Exp. 35 mil. *Hab.* Texas (Belfrage, May 12, No. 632).

Chytoryza, n. g.

♂ ♀. This form I would refer to the series of *Anomis*, *Aletia*, *Pteratholix*. It much resembles the latter in size and color, but it differs by the external margin of the primaries being even, not sinuate, and the want of the ♂ venational characters. Eyes naked, prominent, legs unarmed, abdomen smooth, cylindrical, untufted; wings wide and ample, thorax smooth, untufted. The shape of the wings recalls *Poaphila*, but the apices are blunt, not pointed. Male antennæ simple, ciliate beneath slender.

Chytoryza tecta, n. s.

♂ ♀. Primaries cupreous brown with the lines fine, denticulate accompanied by whitish scales. Reniform conspicuous, being inferiorly filled in with white or yellowish scales, forming a prominent spot which strikes the eye at once. The upper portion of the reniform is obsoletely indicated. The brown shade of the subterminal space deepens up to the s. t. line, which is relieved outwardly by a fine powdering of pale scales, Fringes blackish, paler at the tips. Secondaries wholly blackish, without line, with fringes whitish at tips, at base obsoletely interlined. Beneath pale, hind wings irrorate, with a median denticulate line and small black discal mark preceded by an obsolete dash. Fore wings darker with the terminal space and costal region shaded with yellowish. Legs pale, thorax above like fore wings. *Expanse* 23 mil. Texas (O. Meske).

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Concluded).

274. APOTOMUS ovatus Fab. belongs to the genus PTEROCOLUS.
275. Anthribus fasciatus Oliv. is a TROPIDERES.
276. Chlamys plicata Oliv.
277. Cryptocephalus pubescens Fab. is a PACHYBRACHYS.
278. " notatus Fab. is SELLATUS Suff.

279. Eumolpis vitis Fab. is correctly determined, but is an ADOXUS.
280. Chrysomela philadelphica Linn.
281. " CONFINIS Kby. is *C. spiraeae* Say and a variety of the preceding.
282. " BIGSBYANA Kby.
283. " multipunctata Say.
284. " CLIVICOLLIS Kby. This name should remain. The *C. trimaculata* Fab. is the same, but the name was pre-occupied by Linneus.
285. " rufipes De Geer is C. PALLIDA Linn., a GONIOCTENA.
286. Phaedon Adonidis Pallas. is an ENTOMOSCELIS.
287. " raphani Fab. Probably a correct determination. The species is known in American cabinets as GASTROPHYSA *formosa* Say.
288. " polygoni Linn. is a GASTROPHYSA.
289. Phyllodecta vitellinae Linn.
290. Haltica VICINA Kby. appears to be DISONYCHA ALTERNATA Illig.
291. " PUNCTICOLLIS Kby. is DISONYCHA TRIANGULARIS Say.
292. Galeruca OLIVIERI Kby. is PHYLLOBROTICA DECORATA Say.
293. " CANADENSIS Kby. A TRIRHABDA, and Crotch thinks it a variety of TOMENTOSA Linn.
294. " sagittariæ Gyll. This species and its allies form the genus GALERUCELLA Crotch.
295. " BILINEATA Kby. is a variety of GALERUCELLA NOTULATA Fab.
296. " MARGINELLA Kby. is a GALERUCELLA.
297. Orsodacna TIBIALIS Kby.
298. " CHILDRENI Kby. These two are considered identical, and the latter name adopted.
299. Haemonia NIGRICORNIS Kby. This seems to be the same as that subsequently described by Lacordaire as *Melsheimeri.* I have seen Canadian specimens which do not differ.
300. Donacia FEMORALIS Kby.
301. " FLAVIPES Kby.
302. " AFFINIS Kby. is KIRBYI Lac.
303. " EMARGINATA Kby.
304. " PROXIMA Kby.
305. " CUPRÆA Kby.

306. Donacia HIRTICOLLIS Kby.
307. " æqualis Say.
308. Hispa bicolor Oliv. is an ODONTOTA.
309. Coccinella EPISCOPALIS Kby. is an ANISOSTICTA.
310. " tredecimpunctata Linn. is a HIPPODAMIA.
311. " TRIDENS Kby. is HIPPODAMIA PARENTHESIS Say.
312. " QUINQUESIGNATA Kby. is a HIPPODAMIA.
313. " QUINQUENOTATA Kby. In the revision of the Coccinellidæ Trans. Am. Ent. Soc., 1873, p. 370, Crotch allows the name to remain. In his general revision (published posthumously) London, 1874, the name is placed as a synonym of TRANSVERSOGUTTATA, which is probably correct.
314. " TRICUSPIS Kby. In the London publication the name by Kirby is said to be pre-occupied and changed to KIRBYI by Crotch, but is allowed to remain in the American publication.
315. " INCARNATA Kby. is ANISOCALVIA DUODECIMMACULATA Gebl.
316. Pimelia ALTERNATA Kby. is ELEODES TRICOSTATA Say.
317. Upis ceramboides Linn.
318. Tenebrio molitor Linn.
319. " pensylvanicus Kn. is a NYCTOBATES.
320. Diaperis bicornis Ol. is a HOPLOCEPHALA.
321. Bolitophagus cornutus Fab. is BOLITOTHERUS BIFURCUS Fab.
322. " OBCORDATUS Kby. is a PHELLOPSIS.
323. MERACANTHA CANADENSIS Kby. is CONTRACTA Beauv.
324. Arthromacra DONACIOIDES Kby. is AENEA Say.
325. Cistela ERYTHROPA Kby. is ANDROCHIRUS *luteipes* Lec., which is not rare in Canada.
326. Xylita buprestoides Payk. X. LAEVIGATA Hellen. is an older name.
327. Notoxus monodon Fab.
328. Cantharis UNICOLOR Kby. is a MACROBASIS, *cinerea* || Fab. and *Fabricii* Lec. are its synonyms.
329. Meloe IMPRESSA Kby.
330. " NIGRA Kby.
331. Dasytes FOVEICOLLIS Kby. is a DOLICHOSOMA.
332. Necrobia violacea Linn. is a CORYNETES.

333. Thanasimus ABDOMINALIS Kby. is *nubilus* Klug, a variety of UNDULATUS Say.
334. Cyphon FUSCICEPS Kby.
335. Telephorus ater Linn. (Kby.) is erroneously determined and is FRAXINI Say.
336. " WESTWOODII Kby. The legs of this species are dark. It seems to me merely a variety of the next.
337. " SAMOUELLII Kby.
338. " CURTISII Kby. This and the preceding are the same.
339. " PUNCTICOLLIS Kby. is a PODABRUS.
340. " LAEVICOLLIS Kby. is a PODABRUS.
341. " MANDIBULARIS Kby. does not differ from FRAXINI Say.
342. " BENNETII Kby. is PODABRUS TRICOSTATUS Say.
343. Lampyris corrusca Linn. is an ELLYCHNIA.

Synopsis of Kirby's Species.

Number of species described as new by Kirby	238
Those which retain Kirby's specific names and are known to us	111
Number which must be considered synonyms	108
Specific names pre-occupied and a more recent name used	6
Species in doubt and undetermined by us	16
To be dropped (name pre-occupied and type lost in one instance)	2
Two species mixed under one name	2
Number of species quoted from previous authors	105
Of these there are correctly determined	68
Those which must be placed in synonymy on account of incorrect determination or otherwise	35
Uncertain and unknown to us	2
Australian species described in error	1

ON GENERA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

(Read before the Entomological Club of the A. A. A. S., at Buffalo, N. Y.)

There will hardly be a naturalist who has not spent considerable time to study the questions —What is a genus, and what are generic characters? Indeed, work is nearly impossible without having taken a position with regard to these questions. A full record of the literature, even the most condensed one, would be here out of place, but I have been induced by a recent and most surprising discovery bearing upon this question to make this communication. I have been speaking here only about *natural* genera. The consideration of the genus as an artificial division differs fundamentally, and to avoid mistake we should not call artificial divisions by this name. The characters of artificial genera depend solely upon the taste of the worker and the convenience of separating into groups animals and plants. All species are considered to belong to the same natural genus which agree in structural characters, external and internal, or anatomical ones in the different stages, in transformation, in the manner of living. These definitions of a genus are accepted as well by naturalists who are strong Darwinians as those who oppose the development theory. In a prize essay of the Jena University, D. P. Mayer, a pupil of Prof. Haeckel, in a paper on the "Ontogeny and Phylogeny of Insects," enlarges this definition in so far as he asks for a conformity in the embryological characters. I believe no one will object that this definition is a good and exhaustive one ; but if we attempt to use it in a special case we become bewildered by the astonishing amount of characters unknown to us, and the impossibility to make them out for our work. At present we know hardly well enough the external characters of the imago. Of other characters our knowledge is merely fragmentary and often a *tabula rasa.* We may say that a century of hard work will not fill these gaps in our knowledge. It is obvious that we cannot wait till this enormous amount of work is done. And it is certain that naturalists will not and can not stop creating new genera.

Genera created with such a limited amount of knowledge will depend upon the experience and taste of the worker. Many of such genera will have to be modified or dropped by a farther advancing knowledge.

The most important question (what are generic characters?) is still unanswered.

The large literature and the difference of opinion emitted by pro minent authorities seem to prove that a sufficient affirmative answer is impossible till our knowledge is further advanced. But here, as in other abstract questions, we can proceed in a negative manner by exclusion.

Genera consist of a number of related species. If we knew the character of the species, the specific character, we can by exclusion come nearer to the character of the genus. Species differ by structural character, and as the species form the lowest degree of the classification, we can be sure that species must differ at least by minutest points of structure.

I think there is no objection of consequence possible. I know very well that differences in minuter points of structure have been considered as generic characters. But naturalists beginning with the construction and definition of the higher degrees of class, order, family, &c., used up all characters at hand, till, coming to genera, nothing was left but minute differences of structure: the simple consequence of having used specific characters for generic ones was that nearly every species was considered to be a genus.

I said before that species must differ at least by minuter points of structure. The discovery which I mentioned before proves that structural characters of species are more important, and can by a different manner of living be changed in such a way as to represent forms which were formerly believed to belong to different genera. *Branchipus* and *Artemia*, belonging to the Phyllopod Crustacea, are represented by several species here and in Europe. The two genera are nearly related one to the other, and differ principally in the following points: *Artemia* has eight post-abdominal segments, the last one very long. *Branchipus* has nine post-abdominal segments, the last two of equal size. *Artemia* has three articulated claspers in the male; *Branchipus* two articulated claspers. *Artemia* is often propagated by Parthenogenesis, *Branchipus* never.

Nobody will deny that those characters of structure go very far beyond minuter points of structure, and are marked well enough to justify the separation sixty years ago by Dr. Leach. Now, it is proved that not only the species of *Artemia* known up to to-day from Europe, Asia and Africa, but even some species of *Branchipus* belong to one and the same genus and species. In the American fauna five species of *Artemia* and three of *Branchipus* are described; of course they will have to be studied again

in a similar manner as the European ones. The two European species of *Artemia* are remarkably different. *Artemia salina* has a strongly bifid tail surrounded by 15 to 20 bristles and narrow gills; *Artemia mulhauseni* has a rounded tail without bristles, and very large gills. This latter species lives in pools of a very concentrated salt water of 25° Beaumé; the other species in common salt water of about 8°. In 1871 a dam which surrounded a salt pool containing *Artemia mulhauseni*, broke down by accident and the sea water washed in at the same time; *Artemia salina*, which abounds in the sea water, appeared in large numbers in the pool. The dam was immediately repaired, and in the space of three years the amount of the salt in the pool arrived gradually at the same concentration as before.

A Russian naturalist, Mr. Schmaukevitch, living near the spot and studying carefully *Artemia*, was astonished to find the species somewhat changed in every following generation, till in three years the *Artemia salina* was changed entirely into *mulhauseni*. The fact was so extraordinary that he decided to confirm it by a more conclusive proof. He raised at home in open glass dishes *Artemia salina*, and by successive additions of salt to the water, he was able to transform the species into *Artemia mulhauseni*. To make the counter proof he diluted the water gradually and the species returned to the form of *Artemia salina*. But by continued dilution of the water he was more surprised to find that in the third generations the long abdominal segment began to be separated into two segments, and finally to be changed as in a *Branchipus*. He found later in salt pools of only four to five degrees (living together) *Artemia salina* and *Branchipus spinosa*, and in water with a lower degree of salt two other related species, *Branchipus ferox* and *media*.

Mr. Schmaukevitch has made similar experiments with similar results on *Daphnia*, *Cyclops* and *Canthocamptus*, which he has not yet published. There can be no doubt about the facts under such conclusive proof, and Prof. V. Siebold is now engaged in raising the American species from Salt Lake for similar experiments. These facts oblige us to consider all these different forms as belonging to one and the same species, since it is possible to change at will one form into another by altering the conditions of living. As long as this is possible they cannot be considered as differentiating or Darwinian species. We have now the proof that specific characters exist which do not depend on minuter points of structure. Therefore we are taught that we must considerably enlarge the characters of species and those of the genus.

What has been thus proven in Crustacea will certainly be observed also with other Articulates. Since insects do not possess a post-abdomen, there cannot occur the same differences as in the case cited, but analogous ones will not be wanting. It is obvious that so-called "salt insects" are the first ones which will need new and careful study. Those known are Coleoptera, Diptera, Hemiptera and Orthoptera, and the species are often nearly related to other ones which do not live in salt regions. Further, it is evident that similar changes will be the result of different conditions of life. So-called "local varieties" are certainly nothing else, and a vast field of observation and study is opened by the remarkable discoveries of Mr. Schmaukevitch. I believe that we are now justified when we exclude from generic characters all the following ones:

1. Every character based on the number of parts, when the number ceases to be a small one; the more so when it varies in related species. If a number is larger than about a dozen, we can never rely upon the constancy of the number in antennal joints or anal appendages. In spines, bristles, spurs, a much smaller number is constant: transversal veins of the wings belong to the same category.

2. The external coating of the body, consisting in hairs, scales and other appendages, is not a generic character. The hairs, tufts, brushes, spines, spurs, are often only sexual and can not be considered generic characters; also, hairy eyes, since we find this character changing in the most related species and probably in the same species in Diptera.

3. The presence or want of the ocelli or eyes is not a generic character.

4. The veins of the wings give only to a certain degree generic characters, viz: the principal branches, but certainly not after their bifurcation.

Having arrived so far by exclusion, it is important to state what is left for generic characters.

So far as I am advanced in the study of generic characters, I think the following should be used:

1. The form and relation of the three principal parts of the body.
2. The organs providing nutrition (mouth parts).
3. The organs making possible the working of the mouth parts, *i. e.*, the organs of locomotion.

The anatomical characters may be of prominent help. At present our knowledge as to their details is too limited to admit our using them to a

profitable extent. We begin to be better acquainted with the previous stages, and this acquaintance will bring these characters into more prominence. I doubt embryological characters to be of generic value. But very little is certainly known about them, and nothing known is ready for our use. The parts serving for propagation have probably a higher value than generic characters. Characters for genera should be of a co-ordinate value. I think it is obvious that a genus should never be accepted if its characters are not satisfactorily given, and that genera based on the mere specification of a type should never be accepted.

CORRESPONDENCE.

DEAR SIR,—

In the early part of June I found on the Wax-Myrtle *(Myrica cerifera)* three larvæ unknown then to me. I regret now that want of time prevented me from making an accurate description of them, but my notes simply say: "Looks like a Geometra—may be small Catocala; prettily marked with dark grey; central segments underneath white or light grey."

Only one of the caterpillars produced an imago, and this proved to be *Catocala badia*. It was about fourteen days only in the chrysalis state, and I am now forced to the conclusion that *C. badia* must be double brooded.

W. V. ANDREWS.

P. S.—From what I have observed of the larval habits and appearance of *Catocala*, I am convinced that this genus should be very close to *Geometra*. W. V. A.

Brooklyn, July 7th, 1876.

EXTRACT FROM A LETTER.

DEAR SIR,—

As an example of retarded development, let me mention that three or four years ago I laid aside some old cocoons of *Samia cynthia*, which I thought were empty, and to my amazement, three splendid specimens have this season made their appearance. I know that wonderful stories are told about the abnormally long continuance of some Coleoptera in the chrysalis form, but I never before observed a similar instance in Lepidoptera. Do you know of any?

How are you off for *Schaphinotus elevatas* up there in Ontario? A few days ago, in half an hour, I took thirty from under old railroad ties lying along the track. I was sufficiently *elevated* with my success for one day, and ceased further operations, lest I might exterminate the species!

J. C. Morris, Baltimore, Md.

IMPORTANT CAPTURES.

Dear Sir,—

I made, as I think, a very important capture on the 26th of August which you and some of your readers may be interested in knowing, viz., two fine, fresh and absolutely perfect examples of *Catocala marmorata* Edwards. This is, I think, unquestionably the handsomest of all our known species of *Catocala*. I was not a little surprised, and as might well be imagined, delighted beyond measure to find two such unexpected strangers. My friend, Mr. Charles Dury, of Cincinnati, informs me in a letter received from him a few days ago that he also took one this season in his locality. A figure and description of this truly regal insect may be found in Strecker's work, Plate 9, No. 6. In a note accompanying his description he says: "One can but regret that so little concerning this fine species is known; the original description contains no further remarks than 'from Yerka, California,' and we can only hope that time, which 'at last sets all things even,' will enable us to receive specimens and learn more concerning this superb insect."

My specimens are both males; they were found on the trunks of two separate trees (White Wood or Tulip tree), fifty or sixty feet apart, about five feet from the ground, and both were started before I noticed them, but their flight was very short—only darting around to the opposite side of the tree, where they remained perfectly quiet until I covered them with the bottle.

The peculiar brown dash or band which obliquely traverses the primaries near the posterior extremity, is more dense in my specimens than is represented in Strecker's figure. Mr. Dury says in his it is quite black.

The abdomen of Mr. S.'s figure is, as he tells us, nearly imaginary, the specimen he had to work from not having any remaining, and he was not certain even as to which sex it belonged. The abdomen of mine is very much like *parta*, but heavier, and a shade darker. Length of body 1½ in.: diameter of abdomen in middle, 3½ lines. Anal brush white beneath and blackish above.

Both specimens are alike in size and expand 3 $\frac{1}{10}$ in. No one could fail to be impressed with the princely appearance of this rare insect, and unhesitatingly accord it the first rank among its peers in the interesting group to which it belongs.

Catocalæ have been very abundant here this season. I have taken between 900 and 1000 specimens, and among them some rare species and some that I seldom or never took here before. For example, I have taken *atarah* (as has also my friend, Mr. C. Whitney, in N. H.), which I believe has not been recorded before as occurring north of Texas. I have also taken *amasia*, and a species allied to it, which may prove to be an extreme variety. This also is put down in the published authorities as a southern species. Mr. Whitney informs me he also has taken this species in N. H. this season. And now *marmorata*, which hitherto has been known only as a Californian species. I have one, and perhaps two, that I think are new species, which I may give you a description of when I get time. After a while I may also prepare you a list of the species of *Catocala* occurring here. JAMES ANGUS, West Farms, New York.

HOW DO SPECIALISTS PREFER TO RECEIVE MATERIAL?

DEAR SIR,—

Dr. Henri de Saussure writes in the introduction, page xix, to his Synopsis of "Solitary Wasps" (Amer. Wasps) as follows:

"In a great many collections it is usual to spread the wings and legs of the Hymenoptera. This is mere amateur's work, of no utility for study, sometimes even quite opposed to the purpose in view, by dissimulating the character of the insects instead of exposing it to view. This practice is to be regretted, moreover, by its increasing the value of the insects, on account of the time and expense wasted thereby, so that one is loathe afterwards to place them in the softener, when it becomes necessary to dissect the moth."

In connection with this, I would ask whether Dipterologists and Micro-lepidopterologists prefer things (to be sent to them for study) *spread* or merely pinned. Mr. V. T. Chambers is satisfied to get Tineidæ dead and dry, and even untouched by a pin. Let Mr. Cresson and other specialists announce their preferments. I should be glad to see published the names and addresses of such gentlemen as now are engaged in the study of Tortricidæ, Pyralidæ and Alucitæ, of which groups I will contribute all my accumulated Californian specimens without reserve.

JAS. BEHRENS, P. O. box 1,173, San Francisco, Cal.

The Canadian Entomologist.

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AN EXPERIMENT WITH A STINGING LARVA.

BY MISS MARY E. MURTFELDT, KIRKWOOD, ST. LOUIS, MO.

There is not in the whole group of caterpillars a more innocent and harmless-looking object than the larva of *Lagoa opercularis*—especially just previous to the fourth moult. As it reposes curled upon a leaf, with its long, wavy, white silken hairs the sport of the slightest zephyr, it resembles nothing so much as a tuft of the finest white cotton, and seems almost to invite the touch of caressing fingers. But let the unwary beware of meddling with that treacherous softness; they will find it a veritable "wolf in sheep's clothing!"

I had upon several occasions tested upon my hands the prickles of various stinging larvæ, such as *Empretia stimulea*, *Callochlora viridis*, *Saturnia io* and *S. maia*, &c., without incurring more than a temporary smart, which, if severe, could be allayed by alkaline applications, as ammonia or a solution of soda. This being the case, I did not hesitate to undertake a similar experience with the larva of *Lagoa*, and one evening suffered the larva to be struck sharply against the little finger of my right hand, between the first and second joints. I felt the prickles pierce the skin, but for some time the irritation was but slight. As the evening advanced, however, the pain became severe and was accompanied by considerable inflammation and swelling of the finger. I then thought it advisable to apply some remedy, and tried first soda and then ammonia, but without the expected relief. I next resorted to arnica and camphor and finally to acids, but all in vain; the burning pain—exactly as though I held my finger against glowing coals—seemed rather to increase than diminish, and I felt that for once I was indeed a martyr to the desire (not my own, by the way!) for experimental knowledge. A night of sleepless suffering followed, and it was not until near morning that the pain subsided. No ill consequences followed except the peeling of the skin from

the part affected, but I have since experienced no inclination to cultivate a close acquaintance with this apparently innocent, but really formidable caterpillar.

After the last larval moult, as most Lepidopterists are aware, the larva of *Lagoa opercularis* presents an entirely different appearance from the one above described. The color is no longer white, but a dark gray, with fulvous or ochreous shadings on the dorsum and sides; the long hairs are replaced by a short and dense coating, resembling long-piled velvet, in which the stinging spines are more concealed than they were under the previous hairy coat. This larva is anomalous in one respect. It has, in addition to the four pairs of well-developed abdominal prolegs, two pairs of tubercles on joints 5 and 10, which are not only used as locomotive organs, but are actually provided with the rudiments of hooks.

THE PREPARATORY STAGES OF LYCAENA COMYNTAS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Last year I observed a female *comyntas* depositing eggs upon *Desmodium Marilandicum* Gray, a common and troublesome weed in this region, called "shoestring" by the country people, from its toughness of stem, and bearing a sticking burr in the fall. On 9th July, 1876, I set a female in a bag over a stem of this plant, and several eggs were laid on the tender terminal leaves. Mr. Mead noticed that this butterfly laid also on red clover, and a number of eggs were obtained by the same process, on the 13th July, deposited on the young leaves and on the flowrets of the head. On the 12th, the eggs on *Desmodium* hatched; 15th, one larva passed 1st moult; 18th, the 2nd moult; 21st, the 3rd moult; on or about 26th, the 4th moult; made chrysalis 31st, and the butterfly emerged August 9th. I raised but one of this brood to maturity, but ten on the clover. The single larva was green in all its stages, and its chrysalis was green, but the larvæ on clover were reddish or red throughout, and their chrysalids were sordid white. Whether this difference was owing to the food plants further experiment must determine. The larvæ at first were such minute

objects as to be almost invisible, particularly on *Desmodium*, as both larva and plant were of nearly the same shade of green. On the clover they escaped sight down among the flowrets. Only by keeping them in small wine glasses could I have saved them. On clover, the tender leaves were rapidly eaten by the very young larvæ, a single larva eating out two or three furrows the width of its body, and side by side. As they became larger they seemed to feed on the calyces of the flowrets exclusively, curving themselves to the surface of the clover head, or burrowing into it. On *Desmodium*, as there were no flowers in bloom, only the tender leaves and immature flower buds were eaten. When about to change to chrysalis the larva rested motionless for several hours, usually on the upper surface of a leaf, the green shade becoming gradually yellowish, then red, rusty brown, and a loop was thrown over the body almost mid-length. When the change had occurred, the shape and appearance of the green chrysalis was so like that of the larva as to require some inspection to discover whether it was a chrysalis or no, lying flat on the leaf, the upper side rounded and of almost exactly the larval shape. To make the resemblance still closer, the chrysalis is as hairy as is the larva. I believe that wherever *comyntas* is found, two sizes of the butterfly appear, one of scarcely more than half the superficial area of the other. I do not know of any other species in which this peculiarity is regularly found. Both forms were among the butterflies from these chrysalids. The species is also dimorphic in the female, most of this sex here being black, the others blue with broad black margins. This phenomenon is similar to that of *Pseudargiolus* in its winter form *violacea*. At Coalburgh, there must be several successive broods of *comyntas* during the season, as fresh individuals are seen every month from April to September.

I subjoin a description of the several stages :

EGG ; round, flattened, depressed at top, covered with a frost work of interlaced points ; in color delicate green.

YOUNG LARVA ; length .05 inch ; shape rather cylindrical ; color yellowish, excepting a few white tuberculated points on dorsum, arranged in two longitudinal rows ; a similar row at base of body ; from each of all these points arises a long, curved, white hair ; head nearly as broad as second segment, black, shining, retractile.

Following the larva which fed on *Desmodium :*

After FIRST MOULT ; length .08 inch ; onisciform, flattened, the dorsum flat at top, sloping towards base of body ; color greenish ; the

whole surface irregularly dotted with black; and from most, but not all, of the dots come white hairs, those on dorsum curved back, those nearer base curved partly downward and partly back; head obovate, long and narrow, smaller in proportion to 2nd segment than at last stage, and partly concealed, even when active, in second segment; color black.

After SECOND MOULT; length .12 inch; broader and flatter than before; on each side of the narrow dorsal ridge a slightly raised edge, caused by the tubercles; at the base of the body a fold, and the hairs from this and the ridge are longer than elsewhere; whole surface finely pilose; color green, but with a rusty tint caused by the numerous reddish points; above the fold these take the form of a line or slight stripe; at this stage the division of the segments becomes distinctly apparent.

After THIRD MOULT; length .20 inch; color clear apple green, the crests of the dorsal ridge, and also the fold at base, whitish; on either side of the white line thus caused at the fold, on several of the segments after the middle, but not on the two last, is a reddish line; there is also an indistinct double oblique line of pale green on side of each segment; head as at last stage.

After FOURTH MOULT; length .36 inch, greatest breadth .10 inch; onisciform, high anteriorly, the back rounded and sloping to last segment, which is much flattened; both ends (when the head is retracted) rounded equally, or nearly so; each segment rounded dorsally; the whole upper surface covered with fine white hairs; color emerald green with very many yellow tuberculous points; along middle of dorsum a deep green stripe in a depression; at base a whitish line edged with vinous on three or four segments after the middle; under side and legs pale green; head .025 inch in breadth, longer than broad, obovate, shining black, seen through the 2nd segment when half protracted.

CHRYSALIS; length .26 inch; greatest breadth .10; shaped much like the mature larva, rounded at each end, tapering on the sides somewhat from segments 5 and 6 to head, roundly carinated dorsally, flattened on under side; the mesonotum but slightly prominent; color emerald green, except the abdomen both above and below, which is yellowish green; a dark green medio-dorsal stripe from end to end, and on either side of this a row of small round black spots, nearly the whole length; much covered with fine white hairs; on the top and sides of the anterior segments the hairs are conspicuously longer, and are arranged in tufts, and similar hairs form a connected fringe quite round the abdomen.

The larvæ which fed on clover differed in coloration as follows: color russet varying towards vinous, interspersed with green; at third moult some were pale green dorsally, the white being caused by the tubercles, the sides vinous; the dorsal stripe vinous, and the oblique lines vinous; others had the back as well as sides vinous, and this variation and character followed to maturity. The chrysalids of these larvae were sordid white on the whole upper surface and lower side of abdomen, the former specked with brown; the medio-dorsal stripe was brown, as were also the dots; under side of thorax and of head case, and the whole of the wing cases apple green.

NOTES ON CERTAIN SPECIES OF MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Phyprosopus callitrichoides Grote.

Prof. Zeller published this species subsequently under the generic name of *Sudariophora*, which I, afterwards, adopted in lieu of my own. Prof. Zeller, however, now states that the generic character upon which he founded the name *Sudariophora* does not exist in reality. Accordingly, I now revert to the earlier name for the genus. The insect was erroneously identified as *Doryodes acutaria* by Mr. Walker, and referred by him to the Pyralidæ in the British Museum lists, where it is recorded as *Doryodes acutalis*. It does not seem to have been separately named before I described it. Dr. Packard discusses the position of the species in his work on the *Geometræ*, p. 33, and finds that "the palpi are truly noctuiform, as well as the shape of the wings." In criticising Prof. Zeller's classification of the moth, Dr. Packard omits to state that I had described it previously under the Noctuidæ. Consult Zeller, Beitr., 328–9.

Caterva catenaria (Drury).

The new generic name is proposed since our species is generically distinct from the European forms referred to *Zerene* Treits., a genus which,

according to Stephens, is equivalent to *Bupalus* of Leach. *C. catenaria* occurs in the autumn in various localities in New York State and Pennsylvania, according to our observations. It flies sluggishly in the day time, and collects in numbers about clumps of bushes in fields.

Epimecis hortaria (Fabr.).

In a list of N. Am. Geometræ which I have in MSS., this name is retained instead of *Bronchelia hortaria* Guen. The name is proposed in the Verzeichniss for this and another species, the European *umbraria*, which, however, belongs to *Cymatophora (Boarmia)*, leaving the designation for *hortaria*.

Homopyralis discalis, n. s.

♂ ♀. This is a slightly larger form than *tactus*, and instead of the even brown color of that species, the wings are olivaceous and paler, contrasting with the lines and shadings, which are disposed as in its ally. The pale ground color appears on the extra basal space; the black orbicular is evident. Pale cuneiform spots accompany the t. p. line externally, as well as the black dotted terminal line. There is on the cell of fore wings, and more evidently on hind wings, a *reddish* shade beyond the stigmata. Beneath paler than in *tactus*. Exp. 26–28 mil. New York State (O. Meske; Geo. W. Peck).

Conchylis argentifurcatana, n. s.

Allied to *Ridingsana*. Fore wings olive brown with the internal margin silver striped. From the base to the middle of the wing a silver stripe runs centrally, terminating pointedly. This median stripe is joined to the costa at basal third and coalesces here with the oblique costal stripe, which runs downwardly and outwardly. The lower edge of the median stripe is produced downwardly somewhat squarely before its outer extremity. An irregular silver patch above anal angle. A minute silver dot beyond the first costal stripe. The costa at base is concolorous, not silvery. A sub-apical trigonate patch and a terminal apical discontinued silver band. Hind wings and abdomen fuscous, with paler fringes. This species differs from *Ridingsana* by the shape of the median stripe, which bulges downwardly at about the middle of the wing and sends a branch upwards to costa, coalescing with the oblique costal stripe. Two specimens, from W. Saunders, London, Ont.; taken at Port Stanley, Ont. Expanse 1.55 inch.

Conchylis hipcana, n. s.

Allied to *argentifurcatana*. Ochreous brown; the silver markings rather distinctly outlined in black. Internal margin striped with silver. Before anal angle a silver dot. Median stripe as in *argentifurcatana*, while the inferior bulged prolongation is wider, preceded by a notch of dark scales. An irregular silver patch above anal angle. Costa at base with a silver stripe terminating before the usual oblique costal stripe. A silver spot between this latter and the usual sub-apical trigonate patch. A terminal apical discontinuous silver band. Hind wings and abdomen pale fuscous with whitish fringes. This species differs by the costa being silvery from the base outwardly and by the median stripe not being joined to the first oblique costal stripe by a furcation. One specimen, from W. Saunders, London, Ont.; taken at Port Stanley, Ont. Expanse 1.55 inch.

Eustrotia caduca, n. s.

Among the species of Noctuidæ which I have recently been able to examine is a species of *Eustrotia* reared by Prof. Kellicott from larvæ feeding on the Yellow Pond Lily (*Nuphar advena*), and which I propose to call *Eustrotia caduca*. At first sight it looks like a very large *E. apicosa* (= *nigritula* Guen.), but the differences in ornamentation are at once perceivable on comparison. The colors and their disposition are similar. From the base to the t. p. line the wing is purplish brown, deepening outwardly in tone. The t. a. line is waved. Both stigmata are perceivable, the reniform rather large and quadrate, not oblique as in *apicosa*; they are leather brown in color, as is the terminal portion of the wing beyond the t. p. line. The shaded subterminal line is indented opposite the cell. The fringes are blackish, checkered with leather brown. The hind wings are fuscous, shaded with brown, and with double, faint mesial lines. Head and thorax leather brown. Beneath brighter brown with black discal mark on hind wings, double lines, the disc of the fore wings blackish. The moth expands 28 m. m. Hab. Jackson Co., Michigan.

Selenis monotropa, n. s.

Two fresh specimens, similar in appearance, but evidently of opposite sex from the structure of the frenulum. The male has not the hind tarsi covered with thick scales; but the fore legs are thickly covered with blackish hair, concealing a pale tibial tufting. Wings brownish black with a broad gray costal margin to the fore wings, widening to the base

of the wing, where it attains internal margin, and spreading across the hind part of the thorax. It is darker shaded, somewhat brownish anteriorly. Collar dead black. The black lines are indicated on the gray costal margin. Orbicular a minute dot. Reniform strongly indicated, sur rounded with the pale shading of costal margin. T. p. line continuous, reddish brown where it crosses the gray margin, and here angulate, black below and strongly marked, a little dentate. Subterminal line followed by an interrupted reddish brown shading. Terminal line black, festooned, followed by a pale thread-like line at base of fringes, which latter are blackish. The denticulate black t. p. line continued across hind wings, which agree with the primaries. Over the middle of the wings are two or three blackish shade lines representing the median shade and t. a. line. Beneath a little paler, with small discal marks, white centered. Feet dotted with white ; abdomen blackish. Expanse 31 mil. Hab. Bastrop Co. (O. Meske).

This species seems to be allied to *Selenis lanipes* Guen., of unknown locality. It appears to differ decidedly in color, the continuous black transverse posterior line, and the absence of the multitude of parallel, denticulate, unequal violet gray, reddish and black lines, crossing the wings in *lanipes*. There is also the absence of any sexual character in the clothing of the hind tarsi, unless I have made a mistake in my determination, which, after re-examining both hind wings, I think is not the case. The " ligne coudeé " is, instead of being continuous and evenly strong as in *monotropa*, " indiqueé par des traits noirs plus épais, fondus inferieurement," in *lanipes*. Gueneé's figure represents a similarly sized but much higher colored insect than the one I describe, and I do not think there is any reasonable doubt that they are different species.

NOTES ON THE OCCURRENCE OF ARGYNNIS IDALIA Drury.

BY H. H. LYMAN, MONTREAL, P. Q.

Mr. W. H. Edwards, in his article on *Argynnis myrina*, published on page 189 of Vol. vii, of the Canadian Entomologist, says that in all the species of butterflies which he has made observations on, except *Apatura clyton*, the females emerge as early as the males, and in the course

of the same article he mentions having "bred from the egg four of our larger species of *Argynnis*, viz., *diana, cybele, aphrodite* and *idalia*."

Does *A. idalia* occur in Mr. Edwards' neighborhood, and to what extent has he obtained the imagines from eggs? The only other reference by him in the CAN. ENT. to *A. idalia*, that I can find, is on page 151 of Vol. vii, where he states that Mr. G. M. Dodge had sent him several eggs of this species from Nebraska, and that he had succeeded in carrying a few of the larvæ through the winter and one past the fifth moult, but that this one *died before chrysalis*.

Though I do not presume to question the statements of so distinguished an Entomologist as Mr. Edwards, I thought that I would give my experience with regard to this butterfly, and I should like to know whether any one else has had a similar experience.

I may state that I have collected for eight successive summers on Cape Elizabeth, in the vicinity of Portland, Me., where this butterfly occurs every season, and though generally not common, is sometimes somewhat plentiful.

My experience has been that, though I might find a stray female almost as early as the males, the great majority of females did not appear for a week or ten days after the males. It is only within the last three years that I have kept an entomological diary and numbered my specimens, so that I cannot give any figures with regard to those taken or observed before 1873, but I remember noticing the fact previous to that date; however, this species was tolerably abundant during the past season (1875), and I can give some dates in support of what I say.

By referring to my journal for this year, I find that I took the first ♂ of the season on 20th July, three more on July 24th, on which day I also caught one ♀, and from July 20th to 31st I took altogether 10 ♂ and 1 ♀. Unfortunately the weather during the first half of August was very bad, almost every day being foggy or rainy, or both, so that I am unable to state when the females emerged.

On one partially fine day, Aug. 9th, I obtained another ♂, and during the last half of August worn females were obtainable, but they were too poor for cabinet specimens.

In 1874 this species was very scarce, and I only obtained two specimens, ♂ on July 28th, and a badly rubbed ♀ on Sept. 3rd.

In 1873 it was also scarce and I only took two ♂, one on July 16th and another on the 17th. Of course the cases of 1873 and '74 would

not prove anything, as the number taken was so small, although the last two dates are a good deal earlier than I ever remember to have seen a female, but I consider that the captures of the past season afford strong evidence in favor of the opinion that the males of this species appear at least a week or ten days before the females.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

To the Members of the Entomological Society of Ontario:

GENTLEMEN,—In accordance with time-honored usage, it devolves upon your retiring President at the close of another year of the existence of our Society to offer you a few remarks bearing upon the objects and interests of our body, or of Entomology in general.

And first, gentlemen, I desire to congratulate you on the continued prosperity of our Society and the increasing interest felt and manifested in the furtherance of the chief objects we as an organization have in view, viz., the diffusion of practical information in reference to the life history and habits of our insects, so that we may be able to distinguish our friends from our foes, and thus be placed in a position to apply intelligently such remedial measures for the check of insect ravages as experience may suggest to be most practical and effective.

During the past year circumstances have arisen which have brought our Society more prominently before our people than ever before, notably the fact of the accumulation of that grand collection of Canadian insects which we have prepared and forwarded to the Centennial Exhibition in Philadelphia. My esteemed predecessor, in his annual address last year in Toronto, referred to this proposed work, and expressed himself as confidently anticipating the active co-operation of our members in all sections of our country. The result has more than realized our fondest hopes; our members entered most heartily into the work, bringing together a collection of Canadian insects far surpassing anything ever before seen. The carrying out of the details of this work was entrusted last year to a special committee, consisting of Messrs. Bethune, Saunders and McMechan, and upon consultation it was resolved to accumulate all

the material for this collection at the Society's headquarters in London, and there make such selections from the insects sent as might seem desirable. All our members in London who had collections freely placed them entirely at the disposal of the committee, while many of those resident in other localities throughout the country expressed their readiness to contribute anything or everything in their power to fill up blanks in the desired series of specimens.

As is usual in such cases, the bulk of the work of arranging, classifying and labelling specimens fell upon a few individuals. It affords me much pleasure to have the opportunity of naming especially *one* who has labored most assiduously and has contributed more than any other person towards the success of this enterprise: I allude to my esteemed friend, Mr. Johnson Pettit, of Grimsby, who arranged the entire collection of Coleoptera and freely contributed from his own stores—the accumulation of years—a large proportion of the specimens. The extreme neatness and care manifested by him in the mounting and arrangement of the insects has been the admiration of all, and some idea of the accuracy of his determinations may be arrived at when I say that such authorities as Dr. Horn and Dr. LeConte, of Philadelphia, after a critical scrutiny of the whole series of Coleoptera, filling some twenty-seven cases in all, could only detect two or three errors, and these among the smallest and least conspicuous specimens; such results reflect great credit on the labors of our esteemed coadjutor. In the arrangement of the other departments, your President was ably aided by several gentlemen, notably Messrs. E. B. Reed, J. M. Denton and G. Geddes, of London; indeed, all our London members were ever ready to render all the assistance in their power.

The expenses necessarily attendant on this work have been considerable. The making and lining of suitable cases in which to display the insects, the printing of labels, &c., and the numberless outlays entailed by the transmission of specimens to and fro from all parts of the country, as well as many other incidentals which it is needless to enumerate here, combined, have involved a large outlay. This has been chiefly met by a special grant of five hundred dollars from the Government of Ontario, the remainder being drawn from the Society's resources.

To make the collection as perfect as possible, as far as accurate naming is concerned, the doubtful specimens in the orders most largely represented were submitted to the examination and correction of specialists. The entire collection of Lepidoptera was carefully gone over by Prof. A.

R. Grote, of Buffalo, who generously placed his services at the disposal of the Society for this purpose, and twice visited London in order to complete the work. Dr. Horn also kindly rendered all possible aid in the determination of such Coleoptera as were submitted to him, and to Dr. A. S. Packard we are indebted for naming some of the Geometridæ.

The collection arrived safely and in good condition in Philadelphia, where it at once attracted much attention. The whole display consisted of eighty-six glass cases, forty-five of which were filled with Lepidoptera, twenty-seven with Coleoptera, and the remaining fourteen occupied by the other orders, the whole arranged in a double row on a suitable stand *seventy-six* feet in length, in the Canadian Department in Agricultural Hall.

There were no other collections on exhibition in Philadelphia which would compare favorably with that sent by our Society. There was a very good one in the United States Government Building, from the Department of Agriculture in Washington, arranged by Prof. Townend Glover; this, however, consisted chiefly of Lepidoptera.

There was a small collection shown in the Canadian Department, adjoining that of our Society, consisting of four or five cases, containing Canadian insects representing the various orders; they came, I believe, from Montreal, but I did not succeed in finding the name of the party to whom they belonged. Through the neglect or carelessness of our Canadian Commission, neither this collection nor that of our own Society *are mentioned* in the official catalogue, do not appear to have been entered as belonging to any department of the exhibition, and hence were not examined at all by the Centennial judges. Had it been otherwise, we should no doubt have been honored with awards which, in the case of our Society, if we may judge from the laudatory comments of those best able to form an opinion, were well deserved.

In the Kansas State Building there was a collection from the State Board of Agriculture arranged by Prof. Snow, consisting of thirty cases, sixteen of Lepidoptera (seven of butterflies and nine of moths), five of Coleoptera, two Neuroptera, two Orthoptera, three Hymenoptera, one Diptera and one Hemiptera. These were very well set up, classified, and nearly all named, and were very creditable to Prof. Snow and the Board by whom they were sent. There was, nevertheless, one drawback to viewing them with any satisfaction; the dust was allowed to accumulate on the glasses to such an extent as to obscure the objects contained.

There was a collection from Brazil, shown in the Brazilian Department in the Main Building. This, we were told, was the work and property of a private gentleman residing in Rio Janeiro; it was arranged in thirty-five cases, thirty-one of which were Coleoptera and four Lepidoptera. This collection was very much mixed; there was no attempt made to name the insects, excepting to the extent of partially indicating the family names. Neither was there much effort towards a correct classification; they seemed to be partly arranged with regard to their natural relationships and partly with the view of display. Among the butterflies and moths there were some superb specimens whose brilliance attracted much attention. There were also some very beautiful and interesting things among the Coleoptera. The Curculionidæ were very brilliant and numerous in species, with forms greatly varied; the Cerambycidæ were also remarkable, handsome, and largely represented, some of them of great size. We noticed one enormous *Prionus* fully six inches long; the *Cetonias* were also very beautiful. Some of the Buprestidæ were wonderfully brilliant with metallic shadings, and the Chrysomelidæ very numerous and some of them very charming, the Cassidæ being largely represented. Among the Scarabeidæ there were some enormous specimens, among others, species of *Copris* with remarkable horns, and some brilliant species of *Onthophagus*; there were also a number of very handsome *Elaters*. One of the rarities in this collection was a fine example of *Hypsaphalus armatus*, an extremely rare insect about two inches in length, and of which it is said there are only two or three known specimens in collections. The more brilliant Brazilian insects, especially the Coleoptera, are largely employed by the inhabitants of that country in the ornamentation of jewelry and other fancy articles, often associated in the latter case with the feathers from their brilliant plumaged birds.

In the Department of Queensland there was a large case, filled chiefly with Lepidoptera in a fine state of preservation, embracing many very beautiful and strange looking things; almost the only familiar objects among them were specimens of *Danais archippus*. In this instance, also, none of the specimens were named, which detracted greatly from the interest which would otherwise have attached to them. We learned that this collection had been sold for $150 to Mrs. Bridgham, of New York, a lady who, we believe, takes a deep interest in Entomology and who has a very large and handsome collection of Lepidoptera.

The Orange Free State of South Africa exhibited two cases of insects,

among which there was a curious admixture of millipedes, scorpions and spiders, arranged in a semi-ornamental manner. One case contained chiefly Coleoptera, with a few Hymenoptera, Hemiptera and Orthoptera. Among the Coleoptera there were some curious and beautiful forms, especially among the Cetonidae and Cerambycidae ; also some handsome Scarabeans, Chrysomelans and Curculios. The second case was filled mainly with butterflies, among which there were a few very handsome ones. That cosmopolitan species, "the painted lady," *Cynthia cardui*, was represented by several specimens ; there was also a *Sphinx* closely resembling the deaths-head moth of Europe, and a *Utesthesia* very like our *bella*. Besides these there were a number of very curious and handsome moths, with a few Orthoptera and Neuroptera. No attempt was made in the way of naming anything in this collection, nor any effort at classification.

An American gentleman, whose name I did not learn, had a very curious exhibit of insects in Agricultural Hall, of a purely ornamental character, in three cases. One was a circular arrangement, and was built up chiefly with butterflies and moths ; the other two represented public buildings and were constructed of beetles ; the specimens were immensely numerous and well preserved ; the whole arrangement indicating great ingenuity and perseverance on the part of the collector.

India had a very fine exhibit of silks, raw and manufactured, with the insects and cocoons from which they were obtained. The Tusseh silk-worm moth, *Antherae paphia*, is very handsome, not unlike our *polyphemus ;* the cocoon is egg-shaped, and yields a very strong looking silk. The *Bombyx Huttonii*, or wild silk-worm moth, is also very pretty ; in form it resembles *B. mori*, but its wings are beautifully marked and tipped with brown.

It was very gratifying to observe the prominence given to the study of Natural History in the Educational Departments of many of the nations thus represented at the Centennial. Nearly all of them had small collections illustrating the course of teaching in this branch of study, and in nearly every instance Entomology occupied a prominent position. In the model schools of Sweden and Belgium this was very noticeable ; also in the Russian exhibit, where there were cases of insects of all orders, including in many instances the blown larvae very neatly set up. In the same department in the Japan exhibit there were similar cases fairly classified, illustrating the various orders. The Chinese make use of

insects, too, but with them they are used as medicines; among their *materia medica* collections we observed dried caterpillars, the empty pupa cases of a species of *Cicada*, and other similar substances, all extolled as possessing rare medical virtues.

The bringing together of such an immense number of agricultural productions as are now on exhibition in Philadelphia, including almost every variety of grain, peas, beans and other useful productions on the face of the globe, affords a favorable opportunity for the introduction of any insect pests which may infest these articles in the country of their growth; these, if introduced and acclimatized, may attack similar or related products in this country, unless precautions are taken against their dissemination, and thus we may have new foes to fight which may be very difficult to contend with. The American Centennial Commission, who do not seem to have overlooked anything, have, with wise foresight, appointed a special Commission of eminent Entomologists to report on the insects introduced along with the products exhibited. This report will be looked forward to with much interest by agriculturists as well as Entomologists.

The Agricultural Building, in which our insects were shown, was well supplied with skylights, which admitted a flood of light on everything below. Exposure to this brilliant light for so many months has had a damaging effect on the colors of some of our Lepidoptera, the moths being much more faded than the butterflies; this fading is especially noticeable in insects having any red colors on their wings, such as the Catocalas and Arctians; many of these, however, can be replaced without much difficulty.

Suitable arrangements have been made for the careful packing and re-shipping of the insects at the close of the Exhibition, when they will be forwarded to the Society's rooms in London, Ont. Here it is proposed to keep the collection as far as possible undisturbed, where it will serve a good purpose as a collection of reference for collectors to name their specimens from. Mr. Pettit has kindly consented to allow all that he has contributed to remain in the Society's rooms, and all the London members will follow his example. Mr. Wm. Couper, of Montreal, has generously donated all he has sent to the Society, and I doubt not that most of our other friends in Montreal and elsewhere, who have contributed to the collection, will allow such of their insects as are not represented in our cabinets in London, to remain at least for a time, when no doubt most of them could be replaced. The advantages which will result to our

Society from the possession of a collection so well worked up and so correctly named, can scarcely be over estimated, affording as it will conveniences to collectors for naming specimens such as we have never had before. If for no other reason, we shall, in the possession of these advantages, always have cause to remember with pleasure the hundredth anniversary of American independence.

The continuance of the organ of our Society, the CANADIAN ENTOMOLOGIST, has also contributed greatly to the maintenance of the interest felt in our Society. During the past year important matters have been discussed in its pages, and a mass of new facts, throwing light on the habits and life history of many of our insects, placed before our readers. Much space has also been given to the important department of descriptive Entomology. Indeed, I scarcely think we should be deemed presumptuous in saying that our little journal is an important bond which does much to bind together the brotherhood of Entomologists throughout America.

The recent action of American Entomologists on the subject of Entomological nomenclature claims more than a passing notice. At the meetings of the Entomological Club of the American Association for the Advancement of Science, held last month in Buffalo, N. Y., this important subject was discussed and conclusions reached in reference to it which, I hope, will greatly tend to the stability of our nomenclature, the great end and aim which all parties claim to have in view. Amidst the conflicting opinions held by leading Entomologists on this subject, it was scarcely to be expected that entire unanimity could be secured; but it was most gratifying to notice the conciliatory spirit manifested by all, and the desire apparently as far as possible, to meet each other's views. A series of resolutions touching on important points was presented by the committee named last year to report on this subject, and on some of these they were unanimous, while on others there was a divided opinion. Those rules which were unanimously adopted will, it is understood, be strictly carried out by all who were present, while those on which there was expressed a divided opinion will, in the meantime, be left to be acted on or not, as the individual choice may dictate. Although this does not leave the subject in as satisfactory a state as entire unanimity would have done, still it was felt that by the action taken very much had been done towards settling some of the disturbing elements which interfere with the fixity of nomenclature. A report of these important meetings will be found in the

ENTOMOLOGIST: we commend them to the careful perusal of our readers. Our own Society was well represented in this gathering by the presence of the Rev. C. J. S. Bethune, M. A., E. Baynes Reed and your President.

I shall not attempt, gentlemen, to trespass longer on your time and patience. Thanking you for your kind partiality in electing me to fill so important an office among you,

I have the honor to be very sincerely yours,

WM. SAUNDERS.

London, September, 1876.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

LITHARIAPTERYX, *gen nov.*

L. abroniæella. N. sp. (Or, as it may be popularly translated—the delicate little gem-wing, or gem-wing of the *abronia.*)

This insect is interesting not only for the elegance of its adornment, but equally so for the relation it bears to other genera of the *Glyphipterygidæ.* Comparing it with *Glyphipteryx fuscoviridella, G. thrasonella, Æchmia dentella, Perittia obscuripunctella,* and *Tenagma serriciellum*, its relationship to them may be thus stated: Lacking some of the characters of each genus, it combines many of each. Like *Tenagma* and unlike the others, it has the submedian vein of the fore wings not furcate at the base; the form of wings is almost exactly as in *Æchmia,* but not quite so wide, and the tuft of scales projecting from the hind margin in *Æchmia* is absent; the neuration of the fore wings is almost exactly as in *Æchmia,* except that, as above stated, the submedian is simple in this species, and there *is a distinct secondary cell* as in *Glyphipteryx.* The neuration of the hind wings resembles that of *Tenagma,* the cell being unclosed, but this species has the submedian furcate on the margin and two independent discal veins going to the hind margin, instead of one, as in *Tenagma* (or it would resemble the neuration of the hind wings of *Æchmia* if the discal vein, the submedian and the first branch of the median were absent in that genus.) The characters of the head and its appendages are very

nearly as in *Perittia*. but this insect has the tongue longer and scaled at the base only : as in *Perittia*, there are no ocelli, and no maxillary palpi, the labial palpi (recurved in the living, porrected or drooping in the dead insect) do not over-arch the vertex, but reach only about to the base of the antennae, and taper gradually from the base to the apex, with the articulations indistinct ; the antennae are simple, rather slender, and a little more than half as long as the wings. The ornamentation, though quite distinct from all other *Glyphipterygidæ*, yet reminds one of *Glyphipteryx* by the smooth elevations of violaceous metallic spots, and of Dr. Clemens' genus *Hybroma*, by the dark streak along the base of the costa. Thus the head and its appendages ally this species to *Perittia ;* the wings to *Æchmia*, and less closely to *Tenagma*, while the secondary cell of the fore wings and the ornamentation ally it more remotely to *Glyphipteryx ;* the characters of the larva also ally it to *Glyphipteryx*, but the larvae of the other genera mentioned above are unknown.

Palpi, head and antennae like polished silver, the antennae annulate with brown ; fore wings appearing to the unaided eye silver gray as far as the ciliae, and the apical portion ochreous or golden, according to the light, but under a lens the silver gray portion is resolved into a multitude of narrow wavy lines, alternately white and black, which cross the entire breadth of the wing ; the costal margin from the base to about the basal fourth is velvety black, interrupted by two smooth metallic violaceous streaks, nearly perpendicular to the margin and appearing to be raised a little above the surface, and there is another on the extreme base of the costa which is almost concealed by the patagia (or instead of this, we may say there are three metallic violaceous spots, each widely margined by velvety black, the posterior black margin of each confluent with the anterior black margin of the succeeding one) ; a *very little* further back and still before the middle of the wing length, is another velvety black spot (the fourth, counting the one on the base), containing another metallic violaceous spot, and nearly opposite to this, but a little further back, is a velvety black dorsal spot, containing also a metallic violaceous spot, and further back on the costal margin, behind the middle, are two spots of smooth violaceous metallic raised scales, *not* margined with black, and opposite to the space between them, just within the dorsal margin, near the end of the cell, is another one also unmargined, and on the margin beneath it is a *small* white spot. In some lights all of the metallic violaceous spots appear simply white, and in the golden ochreous

apical part of the wing is a triangular white costal streak pointing obliquely *forwards* and ending in a small violaceous metallic spot. There are thus seven costal spots (including the one on the base), and two dorsal ones, the second dorsal being very small and white, and pointing to the infra-dorsal violaceous spot. Ciliæ fuscous, with a white line extending along the base of those of the dorsal margin. Hind wings purplish fuscous with long white ciliæ. Under surface of both pair purplish fuscous, with the three white costal streaks which are nearest to the apex showing through the wing. Upper surface of the abdomen shining black, each segment margined posteriorly with white; under surface silvery white, each segment narrowly margined anteriorly with black; anal tuft silvery white. *Al. ex.* 5 lines. Edgerton, Colorado; alt. over 6,000 feet.

The imago may be found in the afternoon in July, flitting about in the brilliant sunlight of that region, and alighting on the grass, or on the stalks of *Abronia fragrans*, which is very abundant, filling the air with its rich and delicate, though to me somewhat sickening, fragrance. (The statement in Prof. Gray's "School and Field Book of Botany," that the flowers of *A. fragrans* 'open at sunset' is incorrect, so far as I observed the species, as I have usually found the flowers fully open at all hours of the day. It is, however, more fragrant in the afternoon and evening, but I have never found the flowers frequented by any insect, otherwise than by an occasional visit from a small *Andrena*.) I never saw the species just described upon or in the flowers at any time. The larva resembles that of a *Glyphipteryx*, and mines the leaves of the *Abronia*, as I am fully convinced, though I did not succeed in rearing it, as all my specimens died after becoming pupæ. The moth and its larva are quite common. In twenty-five captured specimens I find no variation. The mine is irregular in shape, and the frass is ejected *usually* from the under side of the leaf, and sometimes there is a slight web on the outside of the leaf. It frequently abandons its old mine and constructs a new one, and once in confinement a well grown larva sewed two leaves together and fed upon them, though I never knew it to feed in this manner except in the breeding jar. It spins its cocoon in the sand. It is one of the prettiest of our 'Micros.'

BLASTOBASIS, Zell.

(HOLCOCERA, Clem).

B. gigantella. N. sp.

White; microscopically dusted with fuscous scales, and the course of

each vein of the fore wings distinctly marked by a fuscous line on the upper surface, so that the neuration is distinct without denuding the wings; abdomen creamy white, with a narrow transverse brown line on top of each segment, just before its hinder margin. *Al. ex.* 15½ lines; probably greater than that of any other species belonging to the Tineina. It is the only species in this group, observed by me, which seems to conform to the law said to be found among other insects and birds of increase in development of peripheral parts in the West. It seems to be a very local species, and of very sluggish habits. I met with it only once, but then found about twenty-five specimens mostly *in coitu*. They were all found resting on the blades of the soap weed, as it is popularly termed in Colorado (*Yucca*), and would require to be thrown violently off from the blade before they would move, but were very active on the wing when once aroused. All of them were found within an area not over one hundred feet square, in a field of about twenty-five acres, and I never saw it elsewhere. This field is on the road to Monument Park, about three miles north of Colorado Springs. The larva will probably be found to feed in some way on the *Yucca*. At all events, there was very little else in that particular locality on which it could feed. The wings are rather narrower in proportion to their length than in other species of the genus.

CORRESPONDENCE.

PARASITE ON SAMIA CECROPIA.

DEAR SIR,—

I have this fall obtained upwards of a dozen examples of *Ophion macrurum* from cocoons of *Telea polyphemus* gathered about Oct. 25th and later. Is not this unprecedented?

I have a record from hearsay, but well authenticated, of two cocoons of *Samia cecropia* emerging the *second* summer.

I found late in October *cecropia* cocoons of this year's make, from which some parasite unknown to me had emerged, either through the loose end or through a round smooth hole bitten out of the cocoon, about the diameter of an ordinary lead pencil. The remains in the inner cocoon were mostly small fragments of blackened larval skin, and in one case the entire back of the larva very neatly cleaned. Can any one enlighten me as to the character of this parasite, which is evidently of unusually large size and power. C. E. WORTHINGTON, Chicago, Ill.

The Canadian Entomologist.

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NOTES ON CANTHARIDES.

BY THE EDITOR.

Read at the Recent Meeting of the American Pharmaceutical Association in Philadelphia.

The fact that we have in America several species of Cantharides, as well as some other closely allied vesicating insects which might at any time be used as a substitute for *Cantharis vesicatoria* (the Spanish beetle), has long been known. The species, however, to which attention has heretofore been chiefly drawn are some of the smaller ones found in the more northern parts of the country, especially *Epicauta (Cantharis) vittata* and *cinerea*, while the larger species south and west have been almost overlooked. The northern species referred to compare very unfavorably in size with the European *vesicatoria*, a feature which adds to the cost of collecting them; it would also appear that this difference of size has often carried with it the impression of a corresponding inferiority. Another bar to their successful inrroduction has been found in their color. By a strange misconception the presence of the brilliant green particles of the wing-cases in the powdered imported insect, has been associated with their activity, and any sample of powdered cantharides or of prepared emplastrum, where these brilliant particles are wanting, would by many physicians be at once condemned. The recent introduction of the Chinese beetle *Mylabris cichorii* has done much to remove the latter objection; still, notwithstanding that it has been shown by Prof. Maisch (see Proc. Am. Pharm. Assoc., 1872) that the *Mylabris* is much stronger than *vesicatoria*, yielding, according to his analysis, fully double the quantity of cantharidin, the relative market price of the insects belonging to the two species indicates that popular prejudice still favors the use of *vesicatoria*. Our *vittata* and *cinerea*, when powdered, nearly resemble the *Mylabris* in color.

In the western and southern portions of this continent we have species which are large and abundant, and which there is every reason to believe possess all the activity we need, and the chief object of this paper is to draw attention to this fact, and if possible to acquaint our members with the appearance of these species, and detail their life history and habits as far as they are known, so that those who reside in these more distant regions may be induced to collect them in sufficient quantities to admit of their being thoroughly tested. It is not probable that they would be found in any respect less valuable as vesicating agents than the Spanish beetle.

Through the kindness of Dr. George H. Horn, of Philadelphia, whose extensive contributions to our knowledge of American Coleoptera have made his name familiar both in Europe and America, we have been supplied with much information in reference to the species here treated of; an acknowledgment is also due to Prof. C. V. Riley, State Entomologist of Illinois, for some valuable notes on the habits of these insects. We have also had a lithographic plate prepared by Messrs. Sinclair & Sons, of Philadelphia, under the kind supervision of Dr. Horn, in which each of the species referred to is figured of the natural size, excepting 7 and 8, which are somewhat enlarged. This plate is remarkably well executed, and is probably one of the best plates of Coleoptera ever published; besides the American species, it contains figures of *M. cichorii* and *C. vesicatoria*.

We shall first enumerate the species, giving brief descriptions, as plain and void of technicalities as possible.

1. *Meloe angusticollis* Say.—This insect (see fig. 1 on plate) is of a dark bluish violaceous color, with the head, thorax and wing-cases thickly punctured with minute dots or impressions. The thorax is slender, narrower than the head; feet slightly hairy, with the spines of the legs reddish. Found in the Eastern States and in many parts of Canada; occasionally abundant under stones.

2. *Cysteodemus armatus* Lec.—Entire body bluish black; thorax with a strong lateral spine on each side; wing-cases very convex, and much larger than the abdomen, which they cover, and with very coarse elevated reticulations on their surface. This insect varies greatly in size; the figure represents a medium sized specimen.

Extremely abundant in Arizona and the desert regions of California wherever the greasewood, *Larrea Mexicana*, grows. This insect is not as

good a vesicant as some others; the proportion of hard tissue in its structure is large as compared with the softer and more active portion, too large, perhaps, to admit of its being of much value.

3. *Mylabris cichorii* Linn.—All parts of this insect are black, excepting the wing-covers, which are of an obscure yellow, with three transverse, black, irregular, undulating bands, the one at the apex broadest. The first band is sometimes interrupted, and occasionally reduced to three or four spots.

Found in abundance in the southern portions of China, and also throughout India, on the flowers of the wild chicory and other composite plants. It is also said to occur in southern Europe, extending from Italy through Greece and Egypt to China. For further details in reference to this insect the reader is referred to an interesting and valuable paper by Prof. Maisch, in the volume of Proceedings for 1872, p. 246.

4. *Macrobasis albida* Say.—All parts of body black, densely covered with minute greenish or yellowish-white hairs. The thorax is slightly longer than wide, the wing-covers broader than the thorax, becoming wider behind, and are densely punctured.

Abundant in Texas, New Mexico and on the plains.

5. *Macrobasis atrivittata* Lec.—Also black; form more elongated than *albida;* head thickly clothed with fine black hairs, with a small white space in front of the eyes; thorax with grayish hairs, with a large black space in the middle; the wing-covers have black hairs, and their apex and sides are margined with gray; there is also a moderately broad grayish stripe extending from the humerus to near the apex.

Found in Texas, and is probably quite abundant, but we have not been able to obtain definite information on this point.

6. *Macrobasis segmentata* Say.—This insect is black also, with the segments of the body beneath margined with whitish. The thorax is nearly as broad as long, and its posterior edges are grayish. Wing-covers finely punctured and sparsely covered with short black hairs.

Occurs with *M. albida,* and is also abundant.

7. *Epicauta vittata* Fab.—The head of this species is of a light reddish color, with darker spots; antennæ black; thorax black, with three yellow lines; wing-covers black margined with yellow, and with a yellow stripe down the middle. Abdomen and legs black, covered with grayish hairs.

Is found throughout the United States and Canada, but more abundant northward and westward of the Carolinas, extending to near the base of the Rocky Mountains. In the south it is replaced by *lemniscata*, a species closely resembling *vittata*, but differs in having another white stripe. This species has been tested, and has been found fully equal to *vesicatoria* as a vesicant.

8. *Epicauta cinerea* Forster.—Black, closely punctured, and clothed with grayish hairs; beneath clothing dense, upper surface variable. Head sparingly hairy. Thorax densely punctured, sometimes entirely covered with gray hairs, often with a large triangular central space black, divided by a grayish line along the middle. Wing-cases finely punctured, and either entirely grayish or margined with grayish all around.

Occurs all over the United States east of the Rocky Mountains, and in many parts of Canada. In the Southern States it becomes larger, with the wing-cases entirely gray; fully equal in strength to *vesicatoria*.

9. *Cantharis vesicatoria* Linn.—Color, above and below, a beautiful shining golden green; head, thorax and wing-covers closely punctured; antennæ black.

Found most abundant in Spain, Italy and the south of France; also found in all the temperate parts of Europe, and in the west of Asia.

10. *Cantharis vulnerata* Lec.—Body black; head orange yellow, sometimes with a broad black stripe down the middle; wing-cases black.

Extremely abundant throughout the entire Pacific region west of the Sierra Nevadas. Dr. Horn has seen bushels of this insect in some localities literally strewing the ground; also very common on a species of *Baccharis*; he has experimented with them and found them powerfully vesicant, and producing strangury very readily when taken internally in the form of tincture.

11. *Cantharis Nuttalli* Say.—Head deep greenish or golden green; antennæ black; thorax golden green with a polished surface, and a few small scattered punctures. Wing-cases golden purple, striped with green. Body beneath green, polished; thighs purplish, feet black. This large and beautiful insect is extremely abundant in Kansas and Colorado.

12. *Pyrota mylabrina* Chev.—Entire body and legs dull ochre yellow. Thorax with two, sometimes four black spots; wing-covers with three transverse black bands, divided in the middle by the suture, the anterior one being sometimes further divided into four spots; knees and feet

black. Found from Kansas to Mexico, and is abundant throughout the whole region.

13. *Tergrodera erosa* Lec.—Body and legs black; head and thorax reddish, the former with a deep groove; wing-covers bright yellow, their surface roughened with coarse reticulations, with a median and apical black band, which in some specimens are wanting. Abundant in Southern California and peninsula of Lower California, on a low herbaceous plant with a blue flower.

In all these species the female is more valuable than the male, especially when well distended with eggs, owing to the relatively larger proportion of the soft parts. Eggs have the same power as the other soft parts; the blood Dr. Horn believes to be more active than any other portion.

Having referred in detail to the perfect insects, it is now proposed to sketch their history as far as known through the earlier stages of their existence.

The life history of *Meloe*, which has been well worked up in Europe, may be taken as a type of all the species mentioned, since all the facts accumulated on this subject point to a similarity in the character of the transformations and habits, which in the vesicating insects are very remarkable.

In the 20th volume of the "Linnean Transactions" there is a memoir on the natural history of *Meloe*, from which many of the following facts are derived.

The *Meloe* beetles, when fresh from their pupa cases in spring, are feeble, move slowly, and have their bodies small and contracted, but after feeding a few days these enlarge greatly, the abdomen of the female expanding to twice its original size owing to the enormous quantity of ova within its body in process of development. The abdomen will then measure an inch or more in length, and appears to be dragged along with difficulty. They are fond of basking in the hot sunshine, and are said to be most active during the early and middle parts of the day. When confined in boxes for the purpose of observing their habits, it is necessary to expose them much to the sun and supply them with an abundance of food; they are then quite at home, and their proceedings may be easily watched. They drink freely of water and require their food to be well wetted. In a few days after leaving their winter quarters they pair.

The eggs are deposited in the earth. A small excavation is made by the female, sometimes as much as two inches in depth, into which, when

finished, she projects her body with the head just perceptible at the entrance. After remaining in this position ovipositing for about two hours, the body is withdrawn and the earth raked with her feet into the hole until it is entirely closed. These burrows are commonly made among the roots of grass in a dry soil and a sunny spot, often on the margins of a dry footpath. The female always deposits two and sometimes three or four separate layings of eggs, at intervals of from two to three weeks. The first is always the most abundant, amounting usually to three or four thousand. After each deposit the abdomen seems to be almost entirely emptied; the insect then feeds voraciously, and fresh ova are soon developed.

The eggs when first deposited are about one-twentieth of an inch in length, slightly conical, obtuse at both ends, and of a bright orange color. They are placed in such a way that they may be parallel to each other, and adhere together at their sides, with one end directed to the entrance of the burrow. The duration of the egg stage is greatly influenced by temperature, averaging from four to five weeks.

From the egg there escapes a little active, agile creature, somewhat resembling a *pediculus* in habits; in fact, the larva of one of the European species was described by so eminent an Entomologist as Kirby, in 1802, as *Pediculus melittæ*. This young larva, a magnified illustration of which is given in Fig. 49,* is of a bright yellow color, and of an elongated form, with fourteen segments. The three segments which constitute the trunk are strong and powerful, for the attachment of the legs, which are furnished with sharp pointed claws, especially adapted for clinging securely to any object. The anal segment on its under surface is developed into a pair of short prolegs. It moves with great celerity with its six true legs; it can also make use of its anal prolegs, and thus climb a nearly smooth and vertical surface.

Fig. 49.

The young larvæ of most insects, if food is not supplied to them within a day or so of the time of their escaping from the egg, will die of starvation, but these young creatures will live from two to three weeks without food and maintain their activity, a wonderful adaptation to the circumstances in which they are placed. When hatched they crawl to the

* The small outline alongside shows this larva of the natural size.

surface and run up the stems of various plants, and often lodge themselves in the flowers and there await the visits of bees and other insects who alight to collect pollen or honey. They watch their opportunity, and attach themselves with great readiness to any of these insects who may come within their reach. It is astonishing with what celerity they fasten themselves to their victims the instant any part of its body is accessible, and with what tenacity they adhere to it, seizing it by the leg, wing, or hairs of the body, and crawling up and adhering around the insertion of its legs between the head and thorax or the thorax and abdomen, exciting the greatest possible uneasiness in the winged insect, who vainly endeavors to detach them from its body.

Some observers are of opinion that the parasite draws nourishment from the bee on which it fastens, but the main object of this instinctive attachment seems to be to get access to the cells in which the young and food are stored. Once here, the young larva of *Meloe* is said to attack the larva of the bee or other hymenopterous insect whose nest is thus invaded, and being furnished with strong mandibles, they thrust them into the soft parts of their victims, and prey on their substance through the wounded integuments, while the young bee is nourished with the stored pollen and honey. In this state, having no longer any use for their active limbs, they are gradually reduced to mere tubercles, and after a change of skin, the once active and sprightly creature assumes the form of a thick, fleshy maggot. In this form it continues to feed on the young bees or the bee bread and honey stored for their use, and after passing through some remarkable changes while in the larval condition, first changing to a semi-pupa, then to another form of larva, it subsequently assumes the true pupa state, in which condition it remains in its snug retreat until the following spring, when it bursts its bonds and appears as a beetle.

The young *Meloe* larvæ often attach themselves to the hairs of insects which construct no cells and do not store up food for their young; and in such cases, which must be very numerous, they necessarily perish. In the light of this fact we can appreciate the importance of the great fecundity of the females.

The larva of *Cantharis vesicatoria* is almost identical in form with that of *Meloe*, but soon after escaping from the egg it changes from a yellow to a darker hue, and finally to a deep black.

The history of our American species is as yet very fragmentary. Dr. Packard has observed the larva of *Meloe angusticollis*, and found it to differ

but little from its European congeners. Prof. Riley has made some observations on *Epicauta vittata*. He describes the eggs of *vittata* as follows: Length 0.08 inch, five times as long as wide, elliptical and so uniform in diameter that it is difficult to say which is the anterior end, though there is a slight difference. Egg sometimes very slightly curved. Color very pale whitish yellow, smooth and shining.

The young larva is yellowish-brown, borders of head and thorax and of joints somewhat more dusky than general surface; tip of jaws and eyes dark brown. Legs and venter paler; venter not corneus except at sides and across segments eleven and twelve. About ten stiff hairs visible superiorly on the posterior border on the middle segments, with a cone-like prominence at the base of each and six minor bristles in front of them. There are also rows of fainter ventral bristles.

The curious history of these insects throws some light on the fact that while in some localities they are enormously abundant one season, they will be very scarce another. It is to be expected that there would be an alternation between the abundance of certain species of hymenopterous insects and Cantharides. When the insects they prey on are abundant the blistering beetles multiply amazingly, and during this immense multiplication exhaust the stock of material on which they feed to such an extent that a year of great abundance in any given locality can scarcely fail to be followed by a season of corresponding scarcity. In other, and sometimes adjacent localities, where the same causes have not operated to a like extent, the insects may be common enough. The great abundance of the sociable and solitary bees in the great plains of the West will probably always afford food sufficient to admit of the maturing of large broods of Cantharides.

AGENCY FOR THE EXCHANGE AND SALE OF COLEOPTERA.

Mr. E. P. Austin, of Cambridge, Mass., has established an agency for the exchange and sale of Coleoptera. Parties having Coleoptera which they desire to dispose of, either in exchange for other species or for cash, should write Mr. Austin.

ON SPECIES OF CATOCALA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Catocala simulatilis Grote.

The male is now taken by Mr. Jas. Angus. The species is larger than *obscura*, agreeing with it in tone and in the white fringes of hind wings; it may be distinguished by the strongly marked median lines of primaries with a deeper toothing. The lines in *obscura* are thread-like, inconspicuous, and with shallower indentations. The opinion expressed that *simulatilis* is the ♀ of *obscura* must be the result of error; as I remarked at the time of describing the species, such a sexual variation would be without a parallel in the genus. *Residua* is distinguished from *obscura* and *simulatilis* by its blackish fringes to the hind wings.

Catocala flebilis Grote.

There occurs a variety of *C. retecta* with shaded fore wings, which may be mistaken for *C. flebilis*, which has peculiar pearly ash fore wings with the outer margin more oblique. Whether Mr. Strecker has figured a variety of *retecta* for *flebilis* is uncertain from the coarseness of his figure. This suffusion of the primaries occurs in *amatrix* among the red-winged species (Group 3).

Catocala Angusi, n. s.

♂ ♀. Six specimens received from Mr. Angus belong to a new form with black hind wings and blackish fringes, except at apex. It belongs then with the series of *C. insolabilis* and *C. residua*, and is similarly sized. It may be distinguished from *residua* by its paler, evenly grayish primaries and by the t. p. line having a longer costal tooth, as in *simulatilis*. Lines distinct; subreniform open. From *insolabilis* it varies by the want of the bright blue gray tint of fore wings and the absence of the darker shade on internal margin. It varies by having in some specimens a basal black shade, and again another from reniform to below apex. Behind the t. p. line its last sinus is usually a blackish shade. Beneath the body is white and the wings as in allied forms, with the outer white bands very narrow. One specimen has the black suffusions very broad, the ground color of the wing very pale gray, and the subterminal gray band distinct, as it usually

is in *residua*. The latter species may be known by the deeper tone of primaries from base to subterminal line. The fore wings in *Angusi* are not dusky as in *residua*, *simulatilis* and *obscura*, but slightly greenish gray, not very bright.

Catocala mira Grote.

This form is mentioned by Prof. Snow. It is as large as *polygama*, without determinate greenish or brown shades on fore wings. Lines black; t. a. more denticulate than in the three allied forms, *crataegi*, *polygama*, *pretiosa*. The pale shade over the sub-reniform from costa is without dark irrorations, distinct. The primaries are pale, more gray and smoother than in contrasted forms. The hind wings are of a *deeper* yellow, bands very similar, while the internal margin is notably *free* from dusky hair and scales. Beneath the black band is broader than in its allies. I do not think that any of these four forms now intergrade. They may be considered as distinct "species."

Catocala cerogama, var. *Bunkeri*.

This form of *cerogama*, received from Mr. Robert Bunker, has the band on secondaries extremely narrow and the yellow basal shade entirely lost. On the fore wings the median space is deeply brown tinted, setting off the white sub-reniform.

Catocala habilis, var. *basalis*.

Differs from the type in the presence of a basal black ray on primaries. On hind wings the median band is broader; the fringe is medially scalloped in black. The terminal inflection of the t. p. line on primaries is deeper and more distinctly black marked. The form seems to be a little larger than the type. Specimens received from Mr. Robert Bunker, taken about Rochester, N. Y.

In studying the black-winged series we may divide them by the fringes in sub-groups.

Fringes white:

1—epione.
2—sappho.—
3—agrippina.
4—lacrymosa.
5—viduata.
6—desperata.
7—retecta.
8—flebilis.
9—simulatilis.
10—obscura.
11—Robinsonii.

Fringes blackish :

12—Levettei.
13—insolabilis.
14—Angusi.
15—residua.
16—tristis.

It is somewhat strange that there are as yet no black-winged species known from California. One is described from Siberia, *C. dissimilis* Bremer.

Catocala relicta.

In my first general paper on the North American species of *Catocala* (Proc. Ent. Soc. Phil., Jan., 1872), the brief notice of *C. relicta* includes the statement that "the narrow central fascia of the secondaries is pure white." Up to this time I find no notice of a distinct powdering of blue scales which edge this fascia (more noticeably sometimes about the middle of the wing) on my present examples. It is not easy to see these blue scales at first, but the attention once directed to them, they become apparent. This discovery leads me to compare more closely our species with the European *fraxini*, which it is held to "represent," and which has the central fascia of the hind wings entirely bluish. The European species seems to be larger than *relicta;* the transverse posterior line less perpendicular, more deeply notched and more outwardly exserted opposite the cell, with more prominent teeth. Above the primaries are evenly dusted with dark scales in *fraxini*, and consequently more unicolorous; the darkest specimens of *relicta* evidently owe their color to a spreading of transverse blackish shades, the ground color, however narrowed, being white. The edge of the hind wings is white in *relicta*, gray in *fraxini*. Beneath both the species are pure white. The similarity of the under surfaces in these two species led me to reflect on the fact that in the Noctuidæ variation seems to be shown first on the upper surface of the primaries; it will be recollected that these are the more often exposed. There is, then, more white on *relicta*, on both wings; the central and principal portion of the fascia on the hind wings being pure white. With a large material in all stages it would be interesting to more fully compare the two species, which have probably a common origin. It is interesting, meanwhile, that the blue color is retained in both forms, although in one it may not always be expressed. If the two species had a common parentage, the blue color has been affected most probably by the different surroundings of the now separated forms.

The fact that the under surface in *fraxini* is bright and white as in *relicta*, while the upper surface of the wings is more obscure than in the American species, is worthy of note. I think that if we may localize the features of variation in markings as occurring first on the upper surface of the wings, especially on the primaries, we may draw some conclusions as to the relationship between different species of Noctuidæ from the degree of similarity beneath. I have elsewhere shown that the variability of *C. relicta* in the tone of the fore wings is not a sexual character.

NOTES ON SOME OF THE GENERA OF MR. SCUDDER'S "SYSTEMATIC REVISION."

BY THEODORE L. MEAD, CORNELL UNIVERSITY, ITHACA, N. Y.

After reading Mr. Peabody's paper in the August number of the CANADIAN ENTOMOLOGIST, I determined to verify some of the measurements given as characterizing Mr. Scudder's genera, as it seemed hardly possible that many of the numerical relations there given should prove absolutely constant; and after examining a large number of species and specimens, these relations proved variable beyond all expectation. The measurements of the venation were taken directly from the wings by the aid of a thin sheet of transparent gelatine ruled with lines $\frac{1}{50}$ of an inch apart, the wings having been bleached by Mr. Dimmock's admirable process.

Recently I have carefully gone over the measurements of the same specimens, of the groups Lycaeides, Glaucopsyche and Cyaniris, with a microscope, measuring by means of an eye-piece micrometer and mechanical stage to the nearest thousandth of an inch, and find that the former measurements coincide sufficiently with these to warrant confidence in accepting the remainder as substantially correct.

The results prove that the venation of the wing is very variable even in specimens of the same species, and that no generic distinctions whatever can be based on slight differences in the proportionate length of the cell and wing, or the origin of the first and second branches of the subcostal nervures of primaries.

I have reduced the proportions of these parts mentioned by Mr. Scudder to percentages, so that comparison will be easy. The species

of Lycænidæ examined were as follows: Of *Lycæides*, *anna*, *melissa*, *acmon*, *Scudderii*; of *Glaucopsyche*, *lygdamas*, *oro*, *Couperii*, of *Cyaniris*, *pseudargiolus* (6), *violacea* (5), *neglecta* (2), *lucia*; of *Everes*, *comyntas* (4).

In the first place, the 1st superior branch of subcostal is given as arising in *Everes* at 50 per cent. +, of the distance from base to apex of cell. I find it to vary from 50. to 54.5. In *Lycæides* it should arise at 67.; I find 52.2 to 59.8. In *Cyaniris* the Revision gives "scarcely $\frac{2}{3}$" (67.—); I find 55.7 to 64. In *Glaucopsyche* it should arise "somewhat beyond the middle" (50. +); I find 57.8 to 63.1. The reader will notice how these numbers overlap each other, thus totally failing to give any distinction between the groups.

The second branch of the same nervure should arise in *Lycæides* at 50 per cent. of the distance between the 1st superior and 1st inferior branches; I find 44.8 to 47.4. In *Glaucopsyche*, also 50 per cent., my results being 37.7 to 46.9. In *Cyaniris* this nervure should arise at "less than half way from base to apex of cell" (50 per cent.—); I find 43.4 to 51.9, and in *Everes* instead of 25., I find 30. to 33. In this last case the numbers do not overlap, probably because only one species (4 specimens) of *Everes* was examined, since the variation among individuals in the other groups is very considerable, and this is the only instance of the kind that I have found in comparing the venation of these genera.

Again, in length of cell as compared to length of wing, *Everes* varies from 43. to 49. per cent. (Revision gives 50.—); *Cyaniris* from 47.3 to 52.2 (Revision gives 50.); *Lycæides* from 47.3 to 48.9 (Revision gives 50+), and *Glaucopsyche* from 49.3 to 51.1 (Revision gives 50+).

I have adduced these Lycaenas since the published article tabulates their differences, but Mr. Peabody has kindly forwarded me advance sheets of a similar arrangement of the characters of other groups, and there the variation is perhaps even more striking than with the Blues.

In the table giving the distinctions whereon are based the genera *Speyeria*, *Argynnis* and *Brenthis* of Mr. Scudder, taking up every character *seriatim*, we find, first, that the antennæ of *Speyeria* and *Brenthis* are "a little longer than the abdomen," and of *Argynnis* "considerably longer than the abdomen." Taking the length of the abdomen as the unit, I found that the antenna measures in *Speyeria* 1.12 and 1.13, in *Brenthis* from 1.15 to 1.44, and in *Argynnis* from 0.93 to 1.37, which is certainly not in accordance with the characters as given.

The next characters relate to the number of joints of the antennæ,

viz., 52 for *Speyeria*, 41 to 49 for *Argynnis*, and 33 to 34 for *Brenthis*. This matter I have not investigated.

The palpi and eye are compared, the length of the eye being taken as unity; in *Speyeria* they are stated to be 1.50, in *Argynnis* 2— to 2, and in *Brenthis* 2—. I find *Speyeria* 1.29, *Argynnis* 1.07 to 1.60, and *Brenthis* 1.33 to 2.

The fore tibiæ are compared with the hind tibiæ, being as .33+ in *Speyeria*, .40 ♂ or .40+ ♀ in *Argynnis*, and .50— ♂ or 50 ♀ in *Brenthis*. I find *Speyeria* .36, *Argynnis* .40 to .45, and *Brenthis* .29 to .44.

The tarsi are said to be scarcely shorter than the tibiæ in *Speyeria*, in *Argynnis* .75+; I find for *Speyeria* .80, and for *Argynnis* .80 to .88.

The middle tibiæ are said to be "a little shorter than the hind pair" in *Speyeria* and *Argynnis*, "scarcely shorter" in *Brenthis*. I find for *Speyeria* .89, for *Argynnis* .85 to .96, and for *Brenthis* .81 to .93.

The 1st superior branch of the subcostal nervure is said to arise in *Speyeria* "beyond the middle of the outer half of the upper margin of cell" (*i. e.*, at 25 per cent.—, inside apex); in *Argynnis* "in the middle of the outer two-fifths of the upper border of cell" (*i. e.*, at 20 per cent. inside apex); and in *Brenthis* "shortly before the apex of the cell." For *Speyeria* I find 22.1 and 24.; for *Argynnis* a range of from 13.5 to 23.6, and for *Brenthis* from 2.6 to 17.5. In a single species of *Argynnis*, viz., *atlantis*, I find in 10 specimens taken at random the surprising variation of from 14. to 23.6.

The next character is the only one among all those given for these three genera that I have been able to verify from specimens, and even here the variability is startling.

Mr Scudder gives the second branch of the subcostal as arising in *Argynnis* at "half way between the 1st and the apex of the cell" (*i. e.*, at 50 per cent.) and in *Brenthis* as at a similar distance beyond it (*i. e.*, at 100 per cent. beyond). For *Speyeria* no corresponding character is given. I find in all specimens which I have examined that this 2nd branch is given off in *Argynnis* within the apex, and in *Brenthis* beyond it, but the precise point varies in *Argynnis* from 55.6 to 15.0 per cent. within apex, and in *Brenthis* from 114. to 1500. per cent. beyond it, Mr. Scudder's unit (the distance between the origin of 1st branch and apex of cell) being adopted.

The last characters relate to the length of cell, which the Revision

gives for *Speyeria* as 40 per cent. of length of wing, for *Argynnis* as "considerably less than" 50, and for *Brenthis* as "nearly" 50. The measurements give for *Speyeria* 40.5 to 46.1, for *Argynnis* 39.3 to 47.6, and for *Brenthis* 39.7 to 48.7, the average of the 26 specimens of *Argynnis* being 44.5, and of the 13 of *Brenthis* 44.1.

Hence we find that out of all the characters given in the Revision as separating these three genera, there are none that divide *Speyeria* from *Argynnis*, and but a single peculiarity separating *Argynnis* and *Brenthis*, and that sometimes varying fifteen hundred per cent. from the numerical ratio assigned to it, leaving out of account, for the present, the number of joints in the antennæ, which I have not been able to investigate as yet. In venation and length of cell, *Euptoieta claudia* agrees with *Brenthis*, being about midway between *bellona* and *myrina*, so that though we might be inclined to accept this character as sufficiently separating *Argynnis* and *Brenthis*, the latter group would need further limitation to exclude *Euptoieta*. The Melitaeas and Phyciodes also have the second branch outside the cell.

A table is appended giving these measurements reduced to percentages, for *Speyeria*, *Argynnis* and *Brenthis*, showing how extremely variable the species and individuals are, and that such proportions are not in any wise to be depended on even for specific characters. A large number of measurements have been made in the genera *Phyciodes* and *Melitæa*, but these results must be reserved for a later paper, since their reduction and comparison will require considerable time, and since a number of additional measurements remain to be made in order to complete the series.

TABLE.

Length Antenna.

(Abdomen = 1.)

A. atlantis	.93
A. aphrodite	1.06
A. Bremnerii	1.08
A. aphrodite	1.11
S. idalia	1.12
"	1.13
A. cybele	1.13
B. bellona	1.15
A. atlantis	1.21
A. cybele	1.21
B. myrina	1.21
A. aglaia	1.24
A. aphrodite	1.26
"	1.33
B. euphrosyne	1.37
B. freya	1.42
B. epithore	1.44

The Revision gives

Speyeria....."a little longer."
Argynnis..... "
Brenthis.. "considerably longer."

Length Palpi.

(Eye = 1.)

A. cybele.....1.07
A. Bremnerii.....1.17
S. idalia.....1.29
B. myrina.....1.33
A. atlantis.....1.40
B. bellona.....1.43
A. aphrodite.....1.50
B. euphrosyne.....1.56
A. aphrodite.....1.58
A. aglaia.....1.60
B. epithore.....1.75
B. freya.....2.00

The Revision gives

Speyeria.....1.50
Argynnis.....2—. to 2.
Brenthis..... 2—.

Length Fore Tibia.

(Hind Tibia = 1.)

B. bellona..... .29
B. myrina..... .29
S. idalia..... .36
B. epithore..... .37
B. freya..... .37
A. Bremnerii..... .40
A. aphrodite..... .41
A. cybele..... .42
B. euphrosyne..... .44
A. atlantis..... .45

The Revision gives

Speyeria..... .33+
Argynnis..... .40 or .40+
Brenthis..... .50— or .50

Length of Tarsi.

(Fore Tibia = 1.)

A. cybele..... .80
S. idalia..... .80
A. Bremnerii..... .88
A. aphrodite..... .89

The Revision gives

Speyeria..... 1.—
Argynnis..... .75—

Length of Middle Tibia.

(Hind Tibia = 1.)

B. freya..... .81
A. atlantis..... .85
A. aphrodite..... .86
B. epithore..... .87
B. euphrosyne..... .89
B. bellona..... .93
B. myrina..... .93
A. Bremnerii..... .95
A. cybele..... .96

The Revision gives

Speyeria....."a little shorter."

Argynnis....."a little shorter."
Brenthis....."scarcely shorter."

1st Branch s. c. from apex cell.

(Length cell = 100.)

B. bellona..... 2.6
B. chariclea..... 8.8
B. myrina.....12.9
B. freya.....13.3
B. arsilache.....13.3
A. aglaia 13.5
A. aphrodite, var. 13.6
A. atlantis.....14.0
B. thore.....14.3
B. amathusia.....14.5
B. triclaris.....15.1
A. Bremnerii.....15.4
B. epithore.....15.8
A. atlantis.....16.1
B. helena.....16.2
A. atlantis.....16.7
B. selene.....16.7
A. atlantis.....17.2
A. cybele.....17.2
B. dia.....17.2
A. Meadii.....17.4
B. euphrosyne.....17.5
A. cybele.....17.6
A. atlantis.....18.1
A. cybele.....18.2
" 18.5
A. atlantis.....18.7
A. aphrodite.....18.9
A. aglaia.....19.5
A. diana.....19.5
A. cybele.....20.0
A. atlantis.....20.0
A. Edwardsii.....20.1
A. cybele.....20.2
A. aglaia 20.4
A. Edwardsii.....21.2
A. atlantis.....21.3
S. idalia.....22.1
A. atlantis.....22.2
A. cybele.....23.1
A. atlantis.....23.6
S. idalia.....24.0

The Revision gives

Speyeria.....25.—
Argynnis.....20.
Brenthis."shortly before apex."

2nd Branch s. c. from apex cell.

(Distance 1st Branch to apex = 100.)

	Inside
A. atlantis	55.6
A. aphrodite, var.	50.0
A. atlantis	48.0
A. Meadii	47.4
A. cybele	44.4
A. atlantis	44.4
A. aglaia	42.9
A. Edwardsii	42.9
A. atlantis	41.7
A. cybele	39.1
"	38.7
A. Edwardsii	38.5
A. aglaia	36.4
A. cybele	35.8
A. atlantis	35.8
A. cybele	34.8

A. diana.. .. ..33·3
A. cybele .. .. 33·3
A. atlantis .. ..33·3
" 28.6
A. aphrodite 28.0
A. Bremnerii.. .. 25.0
S. idalia.. .. ..23·5
" 22.2
A. atlantis 20.0
A. aglaia 20.0
A. atlantis 19.0
" 15.0

Beyond

B. cuphrosyne .. ..114.
B. dia .. .. 146.
B. thore .. ..150.
B. arsilache.. .. 162.
B. selene .. ..182.
B. helena.. .. 191.
B. epithore .. ..200.
B. triclaris.. .. 240.
B. freya .. ..244.
B. myrina .. .. 250.
B. amathusia .. ..282.
B. chariclea.. .. 433.
B. bellona .. ..1500.

The Revision gives

Argynnis.. .. 50. inside
Brenthis .. 100. beyond

Length of Cell.

(Length wing = 100.)

A. Edwardsii.. .. 39·3
B. myrina .. ..39·7
S. idalia.. .. 40.5
A. aglaia .. . 41·3
B. amathusia .. 42.2
B. freya.. .. ..42.5
A. diana .. 42.6
B. arsilache 42.9
A. cybele .. 43.2
B. selene .. ..43·4
A. cybele .. 43·4
A. atlantis .. ..43·5
B. chariclea .. 43.6
B. helena 43.6
B. epithore .. 43·7
A. cybele 43.8
" (2) .. 43·9
" .. . 44.1
A. Edwardsii .. 44.2
A. atlantis .. ..44·3
B. dia.. .. 44·4
S. idalia .. ..44·4
A. atlantis .. 44·4
B. triclaris 44.6
A. aphrodite, var .. 44·7
A. Meadii .. ..44·7
A. atlantis .. 44·9
" 45.0
" .. 45·3
" .. ..45·5
A. Bremnerii .. 46.0
S. idalia 46.1
A. atlantis (2) .. 46.2
A. aglaia 46.6
B. thore .. 46.7
A. aglaia 46.7
A. atlantis .. 47.6
B. euphrosyne ..47.6
A. aphrodite .. 47.6
B. bellona 48.7

The Revision gives

Speyeria 40.0
Argynnis "considerably less than" 50.
Brenthis .. "nearly" 50.

MISCELLANEOUS.

Mr. W. H. Edwards, of Coalburgh, W. Va., wishes to know how far north the black variety of *turnus*, female, is found, and also how it compares in abundance with the yellow variety at the west and south. We trust that some of our readers will be able to supply the needed information.

J. C. Wasserman, 50 Beverley Terrace, Cullercoats, England, wishes to exchange British Lepidoptera for Canadian; parties desirous of exchanging will please write him.

Wm. Barnes, Decatur, Illinois, wishes to exchange insects from Decatur for Canadian insects, and with this view will be glad to correspond with Canadian collectors.

Mr. H. K. Morrison, of Cambridge, Mass., has been engaged during the past summer in collecting the insects of Southern and Middle Georgia and of the Black Mountains of North Carolina (6,700 feet high), the latter a region hitherto unexplored. He has succeeded in obtaining a large series of insects of all orders, especially Lepidoptera and Coleoptera.

CORRESPONDENCE.

OBSERVATIONS ON SPHINGIDÆ.

My summer's experience with the larvæ of rare Sphingidæ is, that *Smerinthus astylus* Westwood. *Smerinthus myops* Harr., *Darapsa versicolor* Clemens, and *Darapsa choerilus* Walk. are all double brooded. A characteristic of *astylus* is its caudal horn, which is armed with two spines at its tip, appearing bifurcate at first glance. These spines are constant from its hatching. Color of horn, dark brown at tip and base; pale green in centre*, pointing forward. The long life in its larval condition, and consequent exposure, may in a measure account for its exceeding great rarity. Have fed some from six to seven weeks.

Smerinthus myops.—I have found that the red blotches on larvæ are not uniform, and are more prevalent on the late brood, although some are entirely green and correspond in color to similar spots found on the leaves of the wild cherry at that season.

Darapsa versicolor.—Caudal horn points backward, is straight until the last moult, when it assumes a fine curve to the rear. Color of curved

* At last moult the dark brown is faded to an extremely light shade.

horn, black above, orange beneath. The larva presents two colors, pale green and brown, which are not sexual distinctions. Eggs of all pale green, slightly flattened. GEO. W. PECK, New York.

NOTES ON VANESSA LINTNERII, FITCH.

In 1856, Dr. Fitch described a butterfly allied to *Antiopa*, and named it in honor of its discoverer, J. H. Lintner.

A butterfly was captured here last summer that is nearly as far removed from *antiopa* as *Lintnerii*. I copy Dr. Fitch's description, and point out the differences. He says: "This butterfly is closely related to *antiopa*, or white bordered butterfly. Its wings have perfectly the same form and are similarly colored to those of *antiopa*, but their pale border is twice as broad as in that species, occupying a third of the length of the wings, and it is wholly destitute of the row of blue spots which occur in *antiopa* forward of the border."

The specimen before me differs from the one described by the Doctor in two respects: the wings are shorter proportionally than in *antiopa*, and shaped more like those of *Vanessa J-album*. In the second place, the lobes or tails of the hind pair of wings are larger and not as pointed as those of *antiopa*. Again, the Doctor says its ground color is deep rusty brown, much more tinged with liver reddish than *antiopa;* the fore margin of the anterior wings is black, freckled with small transverse white streaks and lines, but is destitute of the two white spots which are seen in *antiopa*. My specimen has the white spots mentioned by the Doctor, but they are small and not well defined. The specimen before me coincides with the remainder of Dr. Fitch's description, which is as follows:

"The broad outer border is of a tarnished pale ochre yellow hue, speckled with black the same as in *antiopa*, and becomes quite narrow at the inner angle of the hind pair of wings. The wings beneath are similar to those of *antiopa*, but are darker and without any sprinkling of ash gray scales or any whitish crescent in the middle of the hind pair, and the border is speckled with gray whitish in wavy transverse streaks, without forming the distinct band which is seen in *antiopa*."

ROBERT BUNKER, Rochester, N. Y.

ERRATA.—On page 160 of present volume, 15 lines from bottom, "P. O. Zeller" should be P. C., and 3 lines from bottom, "since he," &c., should read "since—." This sentence has no reference to Mr. Scudder, which by an error of the printer it is made to have.

On page 213, 17 lines from bottom, for *Hypsaphalus* read *Hypocephalus*.

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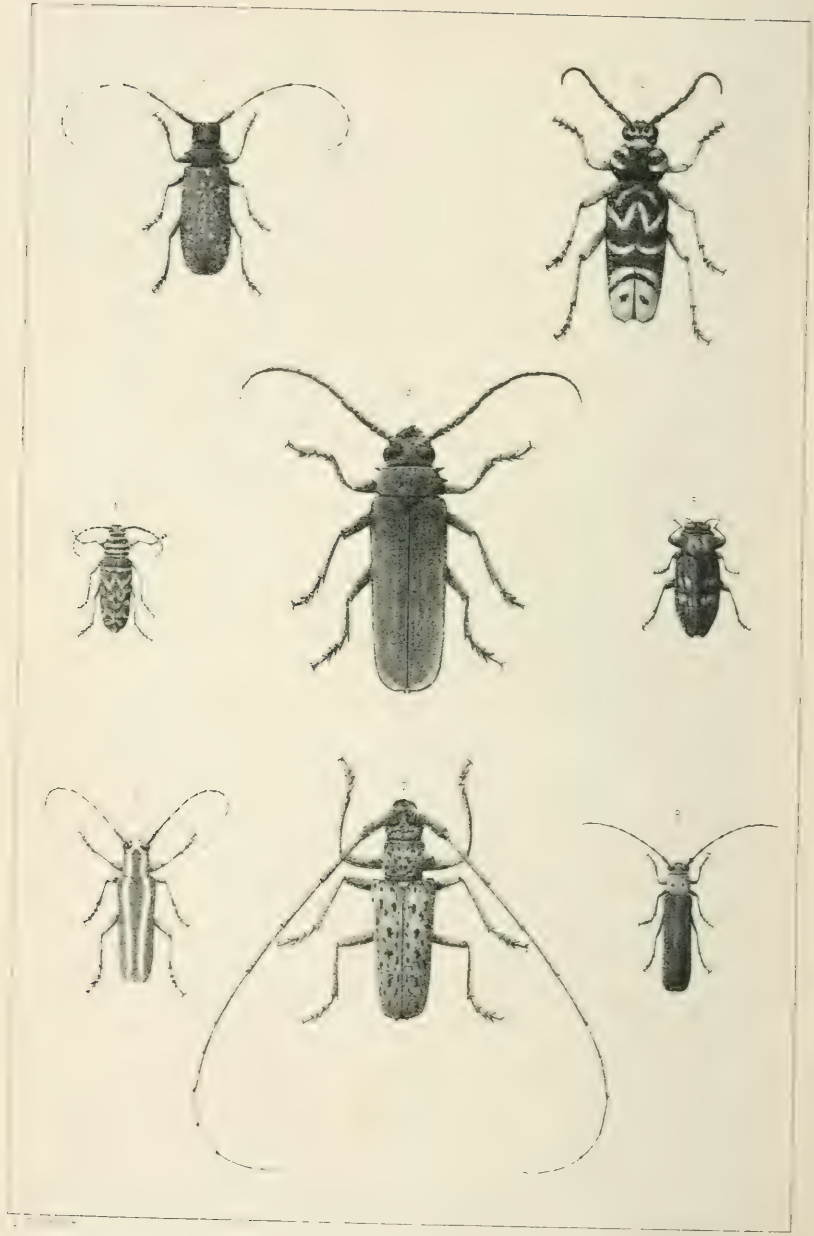
ERRATA IN VOLUME IX.

The following corrections have been kindly sent us by J. A. Lintner, Albany, N. Y. :—

PAGE.	LINE.	CORRECTION.
29	13	For *melana* read *malana.*
90	5	" *robiginosaria* read *rubiginosaria.*
91	last.	" cinerofrons read cinereofrons.
92	27	" Stenopis read Sthenopis.
92	27	" argentimaculata read argenteomaculata.
96	28	" *Hemiluca* read *Hemileuca.*
98	2	" *Pholiosora* read *Pholisora.*
106	3	" *vautalis* read *rantalis.*
117	19	" eurydice read eurytris.
117	1	Place RHOPALOCERA before line 31, p. 116.
117	7	For *Nymphalides* B., read *Melitæa* Fabr.
117	27	dele melinus—a Californian species.
117	26	For lucillius read lucilius.
117	32	" *Palm.* read *Dalm.*
118	3	dele tenuis—a repetition.
118	7	Change SPHINGIDÆ to below HETEROCERA, line 31, page 117.
118	9	For chamoenerii read chamænerii.
118	8	" Carpenter read Charpentier.
118	14	" procris read Americana.
118	24	" Peraphora read Perophora.
118	24	" Hüb. read Harris.
118	31	" Hypurpax read Hyparpax.
118	32	" " " "
120	6	" *Charandra* read *Charadra.*
128	17	" *Smyrinthus* read *Smerinthus.*



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HISTORY OF PHYCIODES THAROS, A POLYMORPHIC BUTTERFLY.

BY W. H. EDWARDS, COALBURGH, W. VA.

In the month of July, 1875, I chanced to be in the Catskill Mts., when Mr. Mead discovered the food-plant of *tharos*, as detailed by him in Vol. vii, ENT., p. 161, this being the common wild Aster, *A. Novæ-angliæ*, and I obtained from him a cluster of eggs: also afterwards got others for myself by tying the females in bags over the stems of the same plant. The larvæ hatched, and while in their younger stages I brought them to Coalburgh. On the journey, stopping at several points, I had to give them leaves of such species of Aster as I could find, and they ate any and all readily—even German Asters from the garden. By the 4th of September they had ceased feeding, after having all passed two moults, and slept. Two weeks later, part of them were again active and fed for a day or two, when these gathered in clusters and presently passed their third moult, and became lethargic, each one where it moulted, with the cast skin by its side. I placed all the larvæ in the cellar, and so they remained till 7th Feb., when such as were alive (many had died from mould), were transferred to leaves of an Aster which had been forced in the green-house. The same day some were feeding. They all passed in due time two more moults, making a total of five in some cases. But whether those larvæ which moulted twice only in the fall did not pass three moults in the spring I cannot say. Further observations are necessary on this habit. The first chrysalis was formed 5th May, and its butterfly emerged on 18th, or after 13 days. Another emerged on 30th, after 8 days, this stage being shortened as the weather became warmer. There resulted 8 butterflies, all *marcia*, 5 ♂, 3 ♀, and all of the variety hereinafter designated C, except one ♀, which was var. B.

The first individuals of the species seen by me, in the field, at Coalburgh, were 3 ♂ *marcia*, on 18th May. A single ♀ was taken 19th, two

on 23rd, two on 24th, and these were all I saw up to the last date, although I carefully watched for them. Shortly after, both sexes became common. On the 26th I took 7 ♀, and tied them up in separate bags, on branches of Aster. The next day 6 of the 7 had laid eggs, the clusters varying from about 50 to 225 eggs each. They were always laid on the leaves, and usually on the under side of them, in rows nearly or quite straight, and touching each other. In the larger clusters the layers were three deep. These gave me hundreds of caterpillars, and each brood was kept separate. The butterflies began to emerge 29th June, the several stages being thus : egg 6 days, larva 22, chrysalis 5. There were four moults and no more, but much irregularity in every larval stage, so that some of the butterflies did not emerge till 15th July. Just after these larvæ hatched I went to the Catskills, taking one brood with me, and they reached chrysalis there, and in that stage were mailed back to Coalburgh. I returned by the time the butterflies from these chrysalids were emerging. There was no perceptible difference in the length of the several periods of this brood and the others which had been left at home, and none of either lot became lethargic. In my absence the larvæ had been cared for by a member of my family, charged to note carefully all changes. The butterflies from these eggs of May, with a single exception, were *tharos*, and this one was *marcia* ♀, var. C. This was the second generation of the season, counting the one which proceeded from the hybernating larvæ as the first.

On 16th of July, at Coalburgh, I again obtained eggs from several females, this time all *tharos*, as no other form was flying. The eggs hatched in 4 days, the larval stage was 22, and chrysalis 7 ; but as before, many larvæ lingered. The first butterfly emerged on 18th Aug. All were *tharos*, and none of the larvæ had been lethargic. This was the third generation in succession, and from the second laying of eggs.

On 15th Aug., at Coalburgh, I again obtained eggs from a single *tharos* ♀, and took them directly to the Catskills, and they hatched just as I arrived there, 20th. This was the fourth generation of the season from the third laying of eggs. The weather in Virginia had been excessively hot, and so I found it on the journey, but on reaching the mountains it was cool, and the nights decidedly cold. Two days after my arrival the mercury stood at sunrise at 40°. September was a wet and cold month, and I protected these larvæ in a warm room at night, and much of the time by day, for they will not feed when the temperature is less than

about 50° Far. The first chrysalis was formed 15th Sept., 26 days from the hatching of the larvæ, and others at different dates up to the 26th Sept., or 37 days from the egg. Forty per cent. of this brood, or 52 larvæ out of 127, became lethargic after second moult. I entered in my journal as follows: "16th Sept., 52 larvæ have ceased feeding at second moult." "26th Sept., fully one-half of the larvæ which had ceased feeding at second moult began to feed again, after resting a few days, and have now passed third moult." After which they became lethargic and so remained. I was much puzzled at finding in the summer that the broods then had but four moults, as I satisfied myself by repeated tests, and that, in each brood, inasmuch as I had noted down three fall moults in some cases, and two in the spring in the larvae of 1875, and written descriptions of them. Moreover Miss Peart had made a drawing of this third fall moult, and it did not correspond with any one of the summer moults, though plainly later than the second, and much smaller than the summer third, besides differing from it in markings. But in the brood of larvae, whose history I have just recited, the two moults show for themselves, as I have them now before me, and the third agrees with Miss Peart's figure. The species passes five larval moults in the winter brood, though perhaps but four in some cases, and there are but four in summer.

I returned to Coalburgh 15th Oct., and till I reached this place the weather on the way had been cold, with several frosty nights. So that for a period of 30 days, the chrysalids had at no time been exposed to warmth. The day I arrived, the butterflies began to emerge, and before the end of a week all that were living had come forth, viz., 9 males, 10 females. Several were dead, from bruises received on the journey. Of these 9 males, 4 were changed to *marcia*, var. C, 3 were var. D, and 2 were not changed at all. Of the 10 females, 7 were changed, 5 of them to var. B, 3 to var. C. The other 2 females were not different from many *tharos* of the summer brood, having large discal patches on under side of hind wings, besides the markings common to the summer brood.

Ten of the chrysalids of this brood I mailed from the Catskills to Mr. Lintner, at Albany, N. Y., asking him to keep them in a cool place and watch the result. I have before me from these chrysalids 6 butterflies, which emerged between 21st Oct. and 2nd Nov., all females, and all of var. B. Of the remaining chrysalids, Mr. Meske, in whose charge they were placed, writes, 27th Dec., that three seem to be still alive, and

one is dead. In nature I do not believe this species ever hybernates in the chrysalis stage. These butterflies were more completely changed than were those from the chrysalids brought to Coalburgh, as appears by comparison of the results in the two cases.

And 18 of the chrysalids I had placed on ice, 20th Sept., laying them in a tin box directly on the surface of the ice, the temperature of the house being 40° Far. Part were so placed within three hours after the forming of the chrysalis, and before they had hardened; others within six hours, and others within nine hours, and so all remained for seven days, that being the longest summer period of the chrysalis. On removing them from the ice, they seemed to me dead. They were soft, and when they became hard had a shrivelled surface. I brought them to Coalburgh, and discovered no sign of life till 21st Oct., when the weather suddenly became hot, the mercury rising to 87°, with a south wind. In two days 15 butterflies emerged, every one *marcia*, not a doubtful form among them in either sex. There were 10 males, 5 females; of the former 5 were of var. C, 4 of D, 1 of B. Of the 5 females, 1 was var. C, 4 of B. The other three chrysalids were dead. All the butterflies of this brood were diminutive, starved by the cold, but those from the ice were sensibly smaller than the others. All the examples of var. B were more intense in the coloring of the under surface than any I ever saw in nature, and the single male was as deeply colored as the females, and this also I never saw in nature. The examples of the other vars. were extreme, but not so unusual.

So much for the Coalburgh broods, and I am able to compare their behavior with those of the same species in the Catskills. When I went thither in June, arriving on the 18th, I found a few male *marcia*, var. D, flying, no females. This was exactly one month later than the first males had been seen at Coalburgh. The first female was now taken 26th June, and on 27th and 28th I took one female each day, all of them *marcia*, var. C. No more were seen, and no *tharos*, though I was daily in the fields. So that the first female was 38 days later than the first at Coalburgh. These three females I set on Aster, and two forthwith deposited eggs. The females of this species give fertile eggs when but a few hours out of chrysalis, just as I have shown, Ent., Sept., '76, that *Arg. myrina* may do.

The eggs thus obtained I mailed to Coalburgh, and returning soon after, found that they had hatched, 3rd July. The first moult occurred on the 9th, the second on 12th, the third on 15th, the fourth on 18th, and

the first chrysalis suspended on 20th, its butterfly emerging 29th July. So that the periods were, egg 6, larva 17, chrysalis 9 days. Five per cent. of this brood became lethargic after second moult. This, then, was the second generation of the butterfly of the season, from the first laying of eggs. All the emerging butterflies were *tharos*, no *marcia*, and all were characterized by an intense blackness of the dark portions of the wings, as compared with any Coalburgh examples. Also nearly all the females showed the discal band on fore wings above yellow, instead of fulvous. (This last peculiarity, the change in the band, appeared in some of the females of the *third* Coalburgh generation, but no other.) On the under side the reticulated lines were unusually heavy, and the marginal cloud and the brown patches largely extended and deep colored.

This second generation was just one month behind the second at Coalburgh. So far only could I trace the Catskill generation this year; but, as in 1875, Mr. Mead obtained eggs on the 27th July and following days, the larvae from which all hybernated, that would be the second laying of eggs of the season, and the resulting butterflies the first generation of the following year.

So that, in the Catskills, the species is digoneutic, there being two generations annually, the first of which is *marcia*, or the winter form, and the other is the summer form, and a certain proportion of the larvae proceeding from the first hybernate (so far as appears) and all those from the second.

At Coalburgh there are four generations, the first of which is *marcia* and the second and third are *tharos*, and none of the larvae from these have so far been found to hybernate; and the fourth, under exceptional circumstances, has produced some *tharos* and more *marcia* the same season, a large proportion of the larvae also hybernating. But had the larvae of this brood remained at Coalburgh, where the temperature for several weeks after they left the egg remained high, the resulting butterflies would have been *tharos*, and the larvae from their eggs would have hybernated. And here I may say that, in addition to the broods spoken of, I also raised others at Coalburgh out of the line of regular succession, as midway between the second and third generations, for example, and none of these larvae became lethargic, and the resulting butterflies were all *tharos*.

The altitude of the Catskill region in which I was is from 1650 to 2000 feet above tide water, and the highest peaks of the range were

directly near. The altitude of Coalburgh is 600 feet. As appears, the changing of the larvae from New York to Virginia, about 40° latitude, besides the difference of altitude, and the reverse, from Virginia to New York, had no perceptible influence on the resulting butterflies of the several broods, except in case of the last one, where the effect of the change of climate was direct on part of them, both as to the form and the size. The periods of the Catskill brood of June may have been accelerated a trifle by transferance to Virginia, but not more, for the weather in the mountains at that time was warm; and the butterflies retained their peculiarities of color, which, as I have stated, were very marked. So also they retained their habit of lethargy, which, I may say in passing, is a very serviceable habit in a two-brooded species of butterfly, in a mountain region, and exposed to sharp changes of temperature. If the fate of the species depended on the last larval brood of the year, and especially if the larvae must reach a certain stage of growth before they were fitted to enter upon their hybernation, it might well happen that now and then an early frost, or a tempestuous season, would destroy all the larvae of the district. The species in the Catskills, in such circumstances, would probably be about as scarce as it now is on Anticosti.

On the other hand, the May brood, taken from Virginia to the Catskills, suffered no retardation of their periods, as compared with other larvae of the same generation left at home, nor was there any change of color, nor did any larva become lethargic. It might have been expected that all of the last brood taken to the mountains would have become lethargic, under the severe conditions to which they were exposed, but the greater number resisted change even in this habit. From all which we may conclude that it takes time to naturalize a stranger, and that habits and tendencies, even in a butterfly, are not to be changed suddenly.

The larvæ of *tharos* are at no period protected by a web, either one common to the community, as with *phaeton*, or one for each individual, after the habit of *mylitta*, according to Mr. Henry Edwards, in lit. They are exposed, just as are the larvæ of *nycteis*, and the only shelter either of these species have is what the leaf over them affords. I have left larvae of *tharos* on the growing food-plant, uncovered by any net, till after first moult, expressly to test the point of a web, as it had been suggested that these larvae might wholly change their natural habit in confinement, something that, so far as I know, larvae never do. The larvae of *nycteis* I have seen naturally on their food-plant until after

third moult, and there was not a thread of a web.* The larvae of *tharos* are sluggish, and a pretty sharp jar is necessary to cause them to drop from the leaf. This they do in a coil, and their bristles effectually protect them from all harm.

When about to moult, the larvæ bred by me ceased feeding, and collected in groups on the covers of the glasses in which I usually kept them, resting for about 36 hours. The body contracted, and as the time for the moult drew near, the skin became glassy as it separated from the newly formed skin beneath. The spines and bristles of the new skin lie folded down and back, and as the old skin, after splitting behind the head, is shuffled past the successive segments. the spines and pencils of hairs suddenly spring up, and the latter instantly become divergent. For some moments the old mask adheres to the new face, but the larva presently proceeds to rub it off with its feet. When the larva prepares for chrysalis, it spins a button of white silk, and hangs suspended for about 24 hours, its position being nearly circular.

As I have shown, *tharos* is polygoneutic in West Virginia, digoneutic in the Catskills, of New York. In a high latitude, or at a high altitude, we might then expect to find it monogoneutic, and restricted probably to the winter form *marcia*. And this is precisely what does occur in the island of Anticosti (about lat. 50°) and on the southern coast of Labrador opposite. Mr. Couper, who collected in 1873 on the island, informs me that *tharos* is a rare species there, though he saw it in localities 100 miles apart; that he saw no examples later than 29th June, from which date "it disappeared"; and adds, "I do not think any of the diurnals on Anticosti or in Labrador produce a second brood." When he left, 27th July, "the weather was becoming cold and very few butterflies of any sort were to be seen." Also, "the summer temperature of Southern Labrador and Anticosti are about the same." Of *tharos* from Anticosti Mr. Couper has sent me 14 males, 8 females. Of these males, all are var. D; of the females, 1 is var. C, 7 var. D. With these also came 11 males, 2 females from Labrador, all of same variety, D. All these examples are of reduced size, as might be expected from so cool a region.

Dr. Weisman states (See Can. Ent., Vol. vii, p. 232), that Dorfmeister was led by his experiments on the effect of cold on the pupae of butter-

* I found last summer that *nycteis* larvæ will eat asters as readily as *Actinomeris squarrosa*, which hitherto I had fed them on.

flies to believe that temperature exerts the greatest influence during the turning into chrysalis, but nearly as much shortly after that time ; and he considers it very possible that a period may be fixed at which the original tendency might be diverted more strongly. As related above, the chrysalids of *tharos* which were subjected to cold three hours after forming reached the same result as those which were exposed six and nine hours after forming. The period of exposure, 7 days, did not seem to me at the time very long for the purpose in view, especially as in Dr. Weismann's experiments the exposure had been from 34 days to three months. This too at a temperature of 33° Far., while in case of *tharos* it was but 40°. It is true, the greater part of the chrysalids of *tharos* which did not have an exposure to this artificial temperature also produced the winter form of the butterfly, but on the other hand some were not changed at all, whereas in all the chrysalids subjected to ice the change was complete and extreme. Nevertheless it would have been more satisfactory had chrysalids of the summer brood been experimented with, and if I live to another summer, I will test the matter. It seems to me very probable that a much shorter exposure to cold immediately after the forming of the chrysalis —a day or two, or even a few hours—may be found to divert the direction of the form, in this species.

There is a very great range of variation in the winter form. It exhibits at least four well marked types, and there are sub-varieties about each of, and connecting, these. The first, A, has the basal area of under side of hind wings (which area comprises half the wings, and is occupied by the reticulated lines, while beyond is a clear field for a certain space) whitened or silvered, as is also the whole series of sub-marginal crescents, and there is either no marginal cloud, or but the slightest ; the extra basal space buff. A sub-var. of this has the basal area whitened, but the rest of the wing clouded, and is between A and B. The second, B, has the whole surface, except a narrow border along costal margin, dark brown, running into blackish, but with a clear white or yellow belt formed of the outer reticulated lines, across the disk. Its principal sub-variety has the brown area broken, discovering a yellow ground, the belt remaining white, and is between B and C. The third, C, is variegated and gay, the ground being of a deep rich yellow, the marginal cloud extended quite to the belt, and ferruginous in color ; a large patch on the disk and another on costal margin, both ferruginous ; the reticulated lines of same color and distance, and a lilac flush over the whole hind margin. Sub-varieties of this have the

ground in shades of buff instead of yellow, the cloud and patches brown instead of ferruginous; sometimes the discal patch large, triangular and occupying a large part of the basal area; or in the form of an oblong band extending from middle of the wing to the inner margin, and met by a similar band filling the cell. C passes by grades into D. The fourth, D, has the ground color reddish-ochreous, the lines ferruginous, as also the extra discal points; the cloud and both patches pale brown, often a mere wash of color; on the fore wings the black spots are reduced and very pale, and the margin is pale fulvous and reddish-ochraceous. Of this type are the northern examples mostly; but in the Catskills and White Mountains, and in West Virginia, the red tint is less decided and the cloud and patches deeper colored.

And this variety D gradually shades into the summer form, particularly in the male, so that many examples of this sex cannot be distinguished from many males of the summer form. There is not much variation in these last, they being generally characterized by a restricted marginal cloud, obsolete discal patch, and very small, if not obsolete, costal patch. But the summer females are of two distinct types, one closely like the male, and consequently also the male of var. D of the winter form; the other quite different from its male, characterized by large brown patches on disk and costa, and a diffuse marginal cloud. This finds its counterpart in the female of var. D, or at any rate agrees most nearly with it, the peculiarities of the winter form being exaggerated in the summer.

Of these varieties, A is rare, and has appeared in none of the butterflies bred by me. I have occasionally taken it on the wing at Coalburgh, and in the Catskills. Var. B is common in W. Va., and nearly all the females taken in the spring are of this type: in the other sex it is rather rare, most of the examples being of var. C. Through the South also as far as Texas, beyond which I have not followed the species, var. B seems to be the prevailing winter form. It becomes less abundant to the north of Virginia, appearing but occasionally in the Catskills. At Albany, neither Mr. Lintner or Mr. Meske ever met with it.

Var. C is common in W. Va., in the male, and somewhat so in the female. So also in N. Carolina, if I may judge by examples sent me by Mr. Morrison. But I have not seen it from farther South, nor from Texas. It is common in the Catskills, and is occasional even to the extreme northern limit of the species.

Var. D is rare in W. Va., but in the Catskills the male of this is most abundant of all; the female much less so, being replaced by C and B to a great degree. Of 3 males, 3 females, sent me from New Hampshire by Mr. Whitney, and taken at random from his collection, all were of the winter form, var. D, except 1 female of the summer form. From Canada, Labrador and Anticosti, all the examples received were D, with an occasional exception of var. C. Of 4 males from Colorado, all were D; of 2 females, 1 is D, 1 C. From Lake Lahache, Br. Columbia, lat. 54°, and perhaps the most northern limit of the species, I have 1 male D, 1 female C. From New Mexico even, taken high in the mountains, 2 males are decidedly of var. D, and similar to the usual type from Anticosti in markings, the under side also being like that, red-tinted.

(To be Continued.)

DESCRIPTION OF A NEW BOTIS ALLIED TO FLAVIDALIS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

I have received from Mr. Frank W. Langdon, of Madisonville, Ohio, a specimen (♀) of a new species of *Botis*, which I name *Botis Langdonalis* after its discoverer. It is one of the largest and most striking forms yet made known, and belongs to the group of *flavidalis*, with which it agrees in the general color of body and wings. The fore wings from base to first transverse line are clouded with fuscous, and stained with ochreous. The two discal marks are present, the orbicular a dot, the reniform a streak. The space between the exterior transverse or elbowed line and the subterminal line is much *wider* than usual, and this space is filled in with a broad fuscous band crossing the hind wings as well; the lines are only indicated by the contrast of color. An ocher discal dot on hind wings. Beyond the broad common band the terminal space is narrowly yellow on both wings. Beneath white, opalescent, with discal dots and the broad shade band repeated. Palpi white tipped with ferruginous; body white beneath. *Expanse* 37 mil. *Length of body* 18 mil.

NOTES ON MELOE ANGUSTICOLLIS.

BY W. BRODIE, TORONTO, ONT.

In the Editor's "Notes on Cantharides," published in the December No. of the ENTOMOLOGIST, there are some particulars in reference to *Meloe angusticollis* which differ somewhat from my own observations on this species, extending over a period of seven years. According to my experience, *Meloes* make their appearance in the perfect state about the end of August or beginning of September, when they feed greedily on *Ranunculus acris*. Later in the season, when the abdomens of the females are much enlarged, they pair, and later still—sometimes after the first frost—they deposit their eggs and invariably die that season.

The larvæ emerge from the eggs early the following spring, and I think attach themselves to bees generally on the blossoms of the willow. I presume this because I often find females about to oviposit near to willow bushes, but I have detected the young larvæ in the flowers of *Caltha palustris*, and suppose they will take to any early flowering plant.

In confirmation of these statements I submit the following from my notes on *Meloe* in the vicinity of Toronto, dating from 1870.

Although *Meloe* is common here, I have never found them much further to the north, and as I am pretty well acquainted with all parts of the county, I would say they are not found in the central nor in the northern portions of the County of York. This is curious, as in the better wooded sections the storing Hymenoptera are more numerous than about Toronto.

1870—Aug. 30th. In early morning saw several *Meloes* descending a white oak tree, in St. James' Cemetery, which tree was afterwards blown down and proved to be a *bee tree*. This would indicate that *Meloe* pupates in the hive, and when perfect, deserts it during the night.

1871. *Meloes* first seen Aug. 10th.

1872—Aug. 20th. *Meloes* feeding on *R. acris*.

1873—Aug.-Oct. *Meloes* very numerous, feeding on *R. acris;* found many females ovipositing in a cold, wet situation, after first fall frost.

1874—Aug. 29th. Found about forty *Meloes* closely huddled in a ball; they were not fighting, and although both sexes were present, do

not think they were pairing. None of the females had large abdomens, and when disturbed they all quickly ran away.

Sept. 1st—10th. Found about sixty *Meloes*, of both sexes, many of them pairing; feeding on *R. acris*, on a small miry patch, about one-fourth acre, bounded on the right by a small stream, which they could not cross; on the left, about 150 yards up a bank, were six hives of neglected bees. This is the same situation where, in 1873, I found females ovipositing after frost.

1875—Aug. Found *Meloes* in same localities as last season. Captured several females; fed them on *R. acris*; they began ovipositing Sept. 20th. Oct. 20th, all dead. The eggs were of an orange color, and placed in a hole about ¾ inch deep and large enough to receive the abdomen.

1876—Aug. 15th. *Meloes* first seen. Sept. 1st, found about fifty in a ball, as I had found them in 1874. Do not think they were either fighting or pairing; could not make out what they were doing; when disturbed they soon ran away. This season they were about as numerous as in 1875, in same localities at same dates.

From these notes, from my own recollections and from the recollections of my children, I infer that *Meloes* make their appearance about the middle of August, that they pair and oviposit before the winter sets in, and that they never survive the winter; and also that they are very seldom, if ever, found under stones in the neighborhood of Toronto.

[We are very glad to get these highly interesting and valuable notes from our esteemed correspondent, and hope to hear from him again before long. As *Meloe angusticollis* is rarely found in our neighborhood, most of the statements made in reference to it were given by us as the results of the observations of others.—Ed. C. E.]

NOTICE.

Tortricidæ.—I shall be much obliged for specimens of *Tortricidæ* from collectors in all parts of the U. S. and Canada, as I am now working on that group. Credit will be given to all persons supplying me with material. It is desirable that notes should be furnished of food plant or date of capture. All material sent to me will be determined as fast as possible, and on the completion of my work, sets of specimens will be returned named to the contributors.

A. R. Grote, Buffalo Society of Natural Sciences.

ON SAMIA GLOVERI AND COLUMBIA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

The type ♀ specimen of *Samia Gloveri* having been presented by Mr. Strecker to the collection in the museum of which I have charge, I have most carefully compared it with the type ♀ specimen of *S. columbia*. I am bound to state that *I cannot find* any difference except the rosy color of *Gloveri*, and there are no characters which I consider of value to separate the two species. I freely admit that the examination, however carefully made, of only two specimens, both of which are old and in poor condition, is scarcely sufficient to determine this point, but I wish to draw the attention of students who may have a larger amount of material for comparison, to the facts stated, with the hope that the true relationship of these insects may be determined.

The suggestion that *S. Gloveri* is perhaps produced by the different conditions surrounding it in the country in which it is found (a salt deformity) is very easily made, but I should object to such a conclusion until we are placed in possession of fuller information regarding the early stages of both species. It would be very interesting and important to know with certainty whether any other Lepidoptera from Utah and Arizona present similar differences in color, among the same or related western and eastern species.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ERRATA.—Ante p. 19, tenth line from top, for "Drura" read Denver. Ante p. 136, eighteenth line from bottom, for "Philonome Staintonella" read P. Clemensella.

Laverna grisseella Cham.

This proves on comparison of specimens to be identical with *L. Murtfeldtella* Cham.

Gelechia glandifluella Zell.

Further examination satisfies me that *G. scita* Cham. is the same species.

G. gallaesolidaginis Riley.

The specimens bred by me in the Rocky Mountains (see *Can. Quar. Jour. Sci.*, v. 2, p. 289) belong to this species, but as suggested *(loc. cit.)* they are much smaller and the markings are indistinct.

Gelechia roseosuffusella Clem.

I have received specimens of this species from Mr. J. D. Putnam, which were taken at Springlake Villa, Utah. It is very widely distributed over North America.

Glyphipteryx montinella Cham.

This species may be distinguished by the fact that the large dorsal streak is behind the first costal streak and opposite to the second, with which it is sometimes confluent ; besides, the first costal streak is as large or sometimes even larger than the large dorsal streak. In some specimens there is a dorsal white spot on or near the base ; the apical half of the fore wings is rather golden brown than golden, as I have described it. The form of the hind wings is like that of *G. equitella*, but much broader, while *G. exoptatella* has these of the same form, and not wider than in *equitella*, or but little so.

Coleophora bistrigella Cham.

In the description of this insect I have considered the golden or "pale sordid ochreous" as the ground color. It will perhaps be more easily recognized if we consider the white as the ground color, with two wide golden-yellow streaks from the base : the first being the widest and going to the apex, and the second near to the dorsal margin.

Gracilaria (Coriscium) quinquestrigella Cham.

A typographical error (I suppose) in the description of this species makes me say : "annulus about the middle of the third joint at its tip" ; the words "and another" should be inserted after "joint." Possibly (though I do not think so) I have two species before me, though there is some variation in the ornamentation. The first four costal white streaks differ in length in different specimens. (These all point obliquely back-

wards, whilst the fifth one, separated a little from the others, points obliquely forwards.) The wing behind the fifth costal streak is a little darker than elsewhere, and some specimens may be said to have a large brownish apical spot. There is a dark brown hinder marginal line at the base of the ciliae, which are tipped with brown at the apex. The line of union of the white of the dorsal margin with the brown color of the wing is irregular, and in some specimens it is marked by distinct brownish spots, and sometimes the white of the dorsal margin contains behind the middle a narrow brown longitudinal line which passes obliquely down towards the apex.

G. alnivorella Cham.

I find a specimen of this species among a few species sent to me from Lake Villa, Utah, by Mr. J. D. Putnam.

Helice palidochrella Cham.

Though the larva is unknown, I am convinced that it feeds in some way upon *Gleditschia triacanthos*. In Kentucky it makes its appearance in the imago about the 15th of May, resting on the trunks of *Gleditschia* trees with the wings horizontal and a little divergent, and the head lowered and abdomen raised. Sometimes the fore wings are so densely dusted towards the apex as to give the appearance (to the inward edge) of a small brown spot lying along the base of the costal ciliae; the base of the costa is usually brown, and sometimes there is a small creamy patch on the wing before the first costal streak, which is a narrow triangle with the apex at the fold, and is sometimes margined before and around its apex with a creamy or pale ochreous color. The legs and abdomen are dark brown or blackish, annulate with white, and the anal tuft is white.

CANADIAN HEMIPTERA WANTED.

At the request of our esteemed correspondent, Dr. White, we gladly find space for the following notice, and trust that during the coming season some of our energetic collectors will devote some attention to this order and aid Dr. White by sending him material.— Ed. C. E.

TO NATURALISTS AND OTHERS.

As I am at present working at the Hemiptera of the world, I should be very much obliged for specimens from any part. For the benefit of those who may kindly wish to help, I give a few hints on the collection and preservation of this neglected order of insects. Hemiptera (which include the various insects popularly known as Plant-bugs, Tree-hoppers, Cicadas, Fireflies, Aphides, &c.) resemble in general appearance Beetles, but have more membranous upper wings (or wing cases), and are usually of softer consistence, besides having their mouth provided with a rostrum or proboscis, instead of jaws. In size, Hemiptera vary from an inch or more to less than one line in length. In color they are also variable, some being exceedingly brilliant, others very obscurely colored. They inhabit trees, shrubs and low plants ; some run about on the damp margins of streams and lakes, some inhabit the surface of the water, and others swim in the water or crawl on the mud below. A few live under the dead bark of trees, and are usually flat and dull colored. The best mode of catching those on trees and shrubs is by shaking the branches over an inverted umbrella ; those that are found on or under low plants (grass or other herbage) may be collected by sweeping the herbage with a net (which can easily be made out of a ring—12-18 inches in diameter—of stout wire, attached to a stick, and having a bag of canvas sewn on to it). They may also be found by searching on flowers and leaves. Those at the margin of the water may be found by searching; those on and in the water by using a net similar to the sweeping one, but with canvas open enough to allow the water, but not the insects, to pass through. Rather shallow, still water, among weeds or in open places among weeds, are the best situations. Many species fly into houses at night, attracted by the lights. In habits these insects are variable : some move slowly, others run or fly with celerity, and others (Tree-hoppers, &c.) jump with great activity. As many species closely resemble each other, it is desirable that *all* specimens met with should be secured. It is also desirable that *small* species as well as large ones should be collected, as it is among the former that most undescribed forms may be expected. To kill and preserve these insects, all that is necessary is that on capture they are put in a bottle filled with spirits of wine (rum, whiskey, &c., will do). Care must be taken, however, that the bottle is kept filled with fluid, otherwise the specimens will be shaken about and broken. So in transit great care must be taken to guard against the evaporation of the spirit. The bottles,

if not filled to the top with specimens, should have the empty space filled with crumpled pieces of paper, then filled with spirit, and tightly corked; all the bottles may then be packed into a larger one, or jar, also filled with alcohol and tightly corked.

In return for any specimens (few as well as many) kindly sent to me, I shall be happy (if wished) to return named specimens, or to give in return named British Lepidoptera, Coleoptera, Hemiptera, or Flowering Plants; or in certain cases I shall be glad to buy specimens.

Communications may be addressed to

DR. BUCHANAN WHITE, Perth, Scotland.

CORRESPONDENCE.

DEAR SIR,—

In ENT. for Nov., Mr. Lyman calls attention to an apparent discrepancy between a statement made by me as to the appearance of the sexes of butterflies and the facts as he has observed them. My statement had reference solely to the butterflies emerging from chrysalids of bred larvæ. No one has failed to observe in the field that the males of most butterflies are seen from several days to two weeks earlier than the females. I have repeatedly mentioned this myself. See notes on *ajax*, on *aphrodite*, and *pseudargiolus*, in Butt. N. A., vol. 1; also, on *cybele*, ENT., 6, 124. Nevertheless, in breeding I have found that either sex may first appear, or they will alternate irregularly until the whole brood has emerged. See mention of this on page 11, Butt. N. A, where of two broods of *ajax* the females first emerged. It is so with all *Papilios*, *Colias*, *Graptas*, etc., etc., that I have bred in any numbers. Of course when one or two butterflies of a brood only were raised, the result would be of no value. Thus a single *diana* and a single *aphrodite* emerged out of a large number of larvæ hatched of each. But in other cases I have bred the butterflies by scores and hundreds, and the result was as stated. In case of *clyton*, the behavior was different; see Butt. N. A., vol. 2. Why such differences between species of butterflies occur, or why bred examples should behave differently from those in the field, I do not attempt to explain.

W. H. EDWARDS, Coalburgh, W. Va.

ON THE HABITS OF AMBLYCHILA CYLINDRIFORMIS, SAY.

DEAR SIR,—

This beetle, usually considered very rare, is, I am satisfied, much more common than heretofore supposed.

I base this opinion on my own observations, and have a good collection to sustain it. Their peculiar habits are evidently the great cause of their rarity, and, once understood, I am positive they will become quite common.

Their geographical distribution is, so far as is now known, rather limited ; yet there is now no reason to suppose that they will not eventually be found extending over a large portion of Kansas and Colorado.

The following is such as I have learned concerning them :

Nocturnal (Crepuscular) rarely being taken until after sunset, and occasionally in the early morning. Found usually along clay banks, where they live in holes generally made by themselves, where they find that seclusion so congenial to their nature. The state of the weather affects appreciably this insect. When cold and blustery they remain concealed, preferring a warm, balmy air ; occasionally *a warm, cloudy afternoon* will entice them from their retreats, but this is rarely to be expected. Like the rest of the *Cicindelidæ*, they are predaceous. They also feed on effete matter. In many of their habits they are like *Asida*.

HARRY A. BROUS, Manhattan, Kansas.

ON CAPTURING CATOCALAS IN THE DAY-TIME.

DEAR SIR,—

According to promise, I give you my method of capturing *Catocalas* in day-light. I very seldom take my net with me when hunting them, as they are such lively insects when in the net that they are sure to injure themselves by rubbing the scales off the thorax, which spoils their appearance. I take with me a long blue beech sapling, a wide-mouthed wine-glass with the bottom broken off, a piece of pasteboard and a small bottle of chloroform. When on the ground where I usually hunt them, which is a wood of white oak and hickory, I commence by rubbing the blue beech stick quickly up and down the side of the tree. The *Catocalas* usually settle low down on the trees, and when disturbed by the noise made by rattling

the stick, they fly off to some other tree near at hand, where they settle with head down and wings closed. I then go quietly up and place the glass over the insect, and with the other hand push the pasteboard under the glass and secure it: a few drops of the chloroform having been poured on the pasteboard, the moistened part is slipped under the glass, and in a very short time the moth is quiet, when I pin it and put it in my box, and start for more game. In this way I rub every oak and hickory tree that comes in my way. I find that the insects prefer the trees of medium size and that some of the darker-winged varieties are oftener met with on the hickory and red oak; yet from the white oak I have obtained by far the greatest number of species and specimens.

The best time in the day for operating is, I think, from 1 to 4 p. m. As the evening advances the moths become more restless and often alight so high up on the trees as to be out of reach. In such cases I have sometimes tied the glass to the pole, and when secured, have drawn them carefully down, rubbing the glass against the bark; this, however, requires to be done very carefully, or the insect will be injured. Sometimes the insects settle with their wings open and head pointing upwards, when they are much more difficult to approach, and if disturbed, will often fly upwards and settle high on the tree.

As to weather, I have succeeded best after a very warm day and night, with the wind southerly: if the wind is a little strong, so much the better, as the moths will not then fly so far when disturbed. They always sit on the north side of the tree, and when the wind is easterly or northerly very few will be found. I have tried the Cyanide bottle, but prefer the wine glass and chloroform, as I think that when treated in this way the specimens have a fresher look. When the weather is windy, I have often observed the black-winged varieties fall to the ground when disturbed, and hide themselves among the grass. In the manner thus detailed I have captured *Catocalas* for seven years past with much success.

WILLIAM MURRAY, 115 Maiden Lane West, Hamilton.

LARVA OF THYREUS NESSUS.

DEAR SIR,—

I am not aware that any description of the larva of *Thyreus (Amphion) nessus* has been given, so I send you the following extract from my notes:

Mature larva of *Thyreus nessus* Cram.—Two and a half to three inches in length, tapering gently from the fourth segment to the head. Color—uniform chocolate brown, thickly dotted over the body, and particularly along the dorsal line, with dark umber, of which color are also the eight lateral or stigmatal stripes. Anal horn on eleventh segment, very short, one-fifth of an inch in length. Very sluggish in its movements, showing none of the irritability of *T. Abbotii* when touched. When at rest, it stretches itself at full length along the leaf, or leaf stem, of the plant on which it feeds, never raising or retracting the anterior segments.

Pupa dark brown ; formed either among rubbish on the surface of the ground, or slightly beneath the surface. Tongue case internal, not visible

Feeds on fuchsia. Pupa 11th, 12th, 13th July. One imago on 8th August. Two others not yet emerged, and probably will winter in the pupa state. Notwithstanding the presence of the anal horn, and the difference in habit betwixt it and *Abbotii*, I regard *nessus* as a true *Thyreus* and recommend its restoration to that genus.

Parthenos nubilis Hüb.—I propose to substitute for the above generic name, which is also occupied by a genus in Rhopalocera (Hüb. Verz. bek. Schmett., p. 38, 1816), the generic name *Catocalirrhus*, reading thus : *Catocalirrhus* W. V. A., *nubilus* Hüb. My reason for changing the name in Heterocera instead of in Rhopalocera (no law preventing it), is on the ground of convenience, the butterflies having a majority of species in this genus. Furthermore, I feel certain that after a little more investigation we shall be able to refer *Catocalirrhus* to *Catocala.*

W. V. Andrews, 36 Boerum Place, Brooklyn, N. Y.

BLACK VARIETY OF P. TURNUS.

Dear Sir,—

In answer to Mr. W. H. Edwards' query concerning the northern limits of the black variety of *P. turnus* ♀, I would say that at Omaha, in this State, the dark variety is more frequently met with than the yellow one. Here at West Point, the species is not so common on account of the scarcity of its food-plants ; however, we have both varieties in about equal numbers. The same can be said of this insect as far north as the Niobrara River, where the species seems to become quite scarce.

Lawrence Bruner, West Point, Nebraska.

The Canadian Entomologist.

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NEW NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Glaea carnosa, n. s.

Size moderately large; eyes naked; tibiæ unarmed; abdomen flattened, with a dorsal carina. Thorax carmine or vinous pink. Fore wings of the same hue over dull olivaceous; the stigmata indistinct, moderate, deep pink with yellow-olive powdery borders; lines obsolete; subterminal indicated and in color like the annulets to the ordinary spots; fringes clear pink. Hind wings lighter pink, with slightly obscure bases and concolorous fringes. Abdomen yellowish pink, with yellow anal hairs. Beneath marked with bright pink: no lines; traces of pink discal marks. Head deeper colored: antennæ pale: breast rich pink. *Expanse* 45 mil. Hab. Oldtown, Maine; Mr. Charles Fish.

I have previously seen a specimen of this fine species in the collection of Mrs. Bridgham, from Rhode Island, as well as the pink egg, if my memory serves me.

Fishia, n g.

The tibiæ are armed; eyes naked, with lashes. Male antennæ brush-like. Cut of the wings as in *Mamestra (i. e., subjuncta);* primaries widening outwardly. Thorax with posterior tuft, and the base of the abdomen strongly tufted. The genus thus combines features of *Mamestra* or *Hadena*, with those of *Agrotis*. The fore tibiae appear to be unarmed; the tongue weak.

Fishia enthea, n. s.

Dull coal black. Ornamentation like *Mamestra subjuncta.* Markings velvety black. A basal dash. Ordinary lines strongly dentate, approx-

imate inferiorly ; claviform touching t. p. line. Stigmata large, concolorous, with incomplete narrow edging. Orbicular large, decumbent. Reniform transverse. T. p. line forming a shallower, more strongly marked and wider sinus on submedian space. Black sagittate dashes surmounted with olive powderings (which mark the s. t. line) on subterminal space between the nervules are continued on terminal space, and become obsolete inferiorly. Hind wings paler, fuscous, powdered with blackish. At the base of the concolorous fringes on primaries a pale line, including pale points at extremity of nervules. No median line on hind wings ; a narrow black terminal line and pale line at base of fringes. Body concolorous ; tegulae and thorax faintly lined. Beneath paler, with discal marks on secondaries. *Expanse* 43 mil. Hab. Oldtown, Maine ; Mr. Chas. Fish, to whom the genus is dedicated.

Cosmia infumata.

I am indebted to Mr. Meske for the information that Dr. Speyer has compared this form (described by me under the allied genus *Orthosia)* with the European *palleacea*, and finds the two very closely allied. Also that *Mamestra dissimilis* var. *discolor* Speyer, is my previously named *Mamestra atlantica*, which may be held to represent the European species with us ; *atlantica* seems to be always distinguishable. Mr. Meske has also drawn my attention to the fact that the tibiae in *Homopyralis discalis* Grote are distinctively pilose.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KY.

In a former paper I have mentioned the fact then known to me only through Dr. Packard's " Record," that Prof. Zeller had described a large number of American Tineina, some of which would no doubt prove to be identical with some described by me. Since then, by the kindness of Dr. Hagen, I have obtained Prof. Zeller's paper, and such species as I have been able to identify by means of his figures and descriptions, are mentioned below, and in addition thereto I think it probable that a few (not more than three or four) other species will be found to have been

described by both of us; but of these I am not by any means certain. I do not recognize *Xylesthia Clemensella* Cham. in any of his descriptions, nor do I find among them anything like the two species that I have described under the generic name *Polyhymno*, while his *Gracilaria* is certainly new. From the seeming abundance of the beautiful *Gelechia elegantella* Cham., I had expected to find it among the Professor's species, but it is not there. Indeed, considering the large number of species described from the same region (North. Middle Texas) by both Prof. Zeller and myself, it is a little singular that many more have not been found common to both collections.

Gelechia quinella Zell.

This is the Texan variety of *G. cercerisella* Cham., vide ante v., pp. 230 and 231. *Cercerisella* has priority.

G. leuconota Zell.

This *may be Phthisis plutella* Cham., and if so, *leuconota* has priority. But Prof. Zeller's figure represents a projection of the white of the dorsal margin into the dark color of the costal half before the middle, which is absent in my three specimens, or very faintly indicated, and the same may be said of the narrow oblique white streak behind the middle, and of the small black costal spot before the apex. But as none of my three specimens is now in perfect condition, this may possibly account for the difference. If the insects are not the same, they resemble each other closely, and both are allied to *Evippe prunifoliella* Cham.

G. pudibundella Zell.

I am not sure that I gather a correct idea of this species from Prof. Zeller's description; but if I do, I think it will prove to be the species previously described by me as *G. rubensella*, the larva of which has been bred and described by Miss Murtfeldt. I have taken it in Kentucky and received it from Missouri and Texas.

Nothris dolabella Zell.

Has been previously described by me as *Ypsolophus cupatoriella*. If Prof. Zeller is right in referring it to *Nothris*, it is *N. cupatoriella*, which has not only priority, but tells the food plant. I have bred and captured it here, and have received it from Mr. Belfrage, collected in Texas. It is widely different from *N. griseella* Cham., also received from Texas. I

am now satisfied that *Begoe costalutella* Cham. is the same species, a little worn and with the tuft of the second palpal joint so evenly and smoothly recurved as to give us the palpi of a *Gelechia*. In some of my specimens of *cupatoriella*, both bred and captured, the blackish spot or streak over and above the fold resembles that of *Gelechia bilobella* as figured by Prof. Zeller, as much as it does that of his figure of *dolabella*.

G. serrativitella Zell.

Prior and equal? to *G. plutella* Cham. I think it is the same species, but Prof. Zeller's figure represents the dorsal margin darker than in my specimens, and the projections of the pale costal hue into the dark dorsal portion as more distinct, and the one before the middle is lacking in my specimens, which have a small whitish dot at the end of the cell not represented in the figure.

G. olympiadella Zell. has some resemblance in the white marking of the wings to *G. trifasciella* Cham., but it is clearly a very different insect.

G. glandifera Zell. has some resemblance to *G. (Sinoe) fuscopallidella* Cham., though quite distinct from it. The pattern of ornamentation is the same in both species, and in *G. obliquistrigella* Cham.

Œcophora determinatella Zell.

This is probably the same as *Œ. australisella* Cham., but if so, the figure is very imperfect, or was made from badly rubbed specimens. In *australisella* the circular yellowish spot at the end of the disc is entirely surrounded by the brownish color; is not connected with the white dorsal spot, and is preceded and followed by a narrow and faint silvery or grayish fascia. More properly, these grayish fasciæ are not composed of gray scales, but the brown scales both before and behind the fascia shine with a grayish lustre. In Prof. Zeller's figure, however, these fasciæ are not represented, and the spot instead of being completely round, passes out backward to unite with the dorsal white spot. In *australisella* this white spot is simply the dorsal end of one of the fasciæ, whiter and more distinct than the remainder. Still I have no doubt it is the same species, and *determinatella* has priority as the specific name. I have a worn specimen agreeing with Prof. Zeller's figure in all respects.

(As will be seen by refering to the June No., 1875, the description of

australiscella was by some mistake not published, and believing it to be the same with *determinatella* Zell., I determined not to publish it.)

Œ. constrictella Zell.

The size and ornamentation of this species, as described and figured by Prof. Zeller, are so nearly identical with those of *Theisoa bifasciella* Cham., that I was at first convinced it was the same species, and can now, after the most careful examination, only doubt whether they are the same. *T. bifasciella* was described by me in the CAN. ENT. for 1874, and consequently, if they are the same, *constrictella* is the specific name by priority. But if they are the same, the reference of the species to *Œcophora* is certainly very wide of the mark. It is true the characters of the head and appendages of *bifasciella might* do for those of an *Œcophora;* and it was owing to these characters and the position of the insect in repose that I separated it under the generic name *Theisoa* from *Elachista*, to which it is, in my judgment, much more nearly allied than to *Œcophora*. The insect in repose sits, or rather stands, with the body elevated above the surface on which it stands, with the wings horizontal and a little separated or spread, and the head a little lower than the apex of the wings. But the wings are too narrow and ciliæ too long for *Œcophora;* and the neuration is widely different. The neuration and form of the hind wings is exactly that of *Elachista obscurella (Ins. Brit., v. 3)*, except that the subcostal vein is distinct throughout its entire course; and the fore wings only differ from it by having the median subdivided into two instead of three branches; but one of these branches is furcate; and the second branch of the apical vein (the one going to the dorsal margin) is absent in *bifasciella*. The cell is unclosed in the hind wings, and the submedian vein of the fore wings is not furcate at the base. The neuration is still nearer to that of *Elachista præmaturella* Clem. Surely such an insect as this can not with propriety be placed with *Œcophora!* Prof. Zeller says: "*Fascia ante medium cinnamomea, exterius albido-marginata*," &c., while I describe it *loc. cit.* as "basal third of primaries pale saffron slightly suffused with fuscous," and "at the basal third of the primaries a silver white fascia dark margined internally," &c. A reference to Prof. Zeller's figure shows that both descriptions mean the same thing. He defines the color perhaps more correctly than I do. The color gradually increases in density from the base backwards, and just before the fascia suddenly becomes a little darker and ends in a narrow row of brown

scales; in some specimens this sudden darkening does not take place; it is gradual up to the line of dark scales. It is unimportant whether we say a cinnamon fascia margined behind with white, with Prof. Zeller; or a white fascia dark margined before, as I have it. This fascia is sometimes in *bifasciella* much curved, as Prof. Zeller has it, while in other specimens it is almost exactly straight. The white fascia of Prof. Zeller is more distinctly defined behind than I have ever found it in *bifasciella*, where it gradually passes into the pale cinnamon yellow which increases in intensity to what I have called the second fascia; this second fascia sometimes crosses the wing as in Prof. Zeller's figure, but is never so wide or so distinctly outlined behind, but perhaps more frequently it is widely interrupted in the middle so as to make a costal and opposite dorsal white streak, as I have elsewhere mentioned, and in a specimen now before me it crosses one wing, while in the other wing it is simply represented by a costal streak hardly reaching the middle: the dark costal triangular spot of Prof. Zeller is distinct in every specimen that I have examined, but I have never found in any specimen the opposite elongate, narrow, somewhat paler dorsal triangle which in the figure extends to the apex of the costal triangle. The small discal dot of the middle of the wing is sometimes present, and sometimes absent in *bifasciella*. I think the wing behind the first fascia is more correctly described as pale saffron somewhat suffused and dusted with brownish, than as cinnamon; but some specimens are much paler than others. In *bifasciella* the costal margin behind the second white fascia is fuscous (but little paler than the costal triangular spot before it), and much darker than the remainder of the apical part of the wing, and forms a definite spot much darker than it is represented by Prof. Zeller; and he represents a narrow whitish line extending along the base of the dorsal ciliae, widest at the apex of the wing and narrowing to a point at the beginning of the dorsal ciliae, which I do not find indicated in any of my specimens of *bifasciella*; and the hind wings of this species are pale silvery yellowish, or perhaps as properly, pale luteous.

If my specimens do not belong to Prof. Zeller's species, the resemblance in coloration is astonishing, and if they do belong to it, then the form and neuration of the wings place it among the *Elachistidæ*, and not in *Œcophora*.

(To be Continued.)

NOTES ON A COLLECTION OF CANADIAN MOTHS MADE BY WM. S. M. D'URBAN, AND NAMED BY F. WALKER.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The collection which forms the subject of this paper was kindly presented to the Ent. Soc. Ont. by Mr. D'Urban, and the specimens are kept for reference in the form in which they were given, because they were determined by Mr. Walker, the labels all being in his handwriting and many of the insects being types of his species. Many of the species were collected in the valley of the River Rouge, and some of them are mentioned in two papers in the *Canadian Naturalist and Geologist*, vol. 5, pages 91–6, and vol. 6, pages 36–41.

"Pyralis n. sp.?" v., 95. The specimen here described is *Asopia devialis* Grote.

"Dasychira clandestina," vi., 36. This ♂ specimen seems to be a distinct species belonging to the genus *Gluphisia*.

"Audela acronyctoides," vi., 37. The species and genus in this instance appear to be good, and not otherwise known in collections. The specimen is in poor condition, but its ornamentation being marked, the species is quite recognizable: there are no antennæ remaining. Mr. Walker gives them as "slightly pectinated, branches sub-clavate." The species is slenderer, but distantly recalls *Platycerura furcilla*.

"Bryophila? spectans," vi., 38. Is *Microcælia fragilis* of Guenée.

"Microcœlia? retardata," vi., 38. Is *Acronycta dissecta* G. & R.

"Cleora limitaria," vi., 39. The specimen so named approaches very closely to *Lobophora vernata* Packard.

Two new species of *Cleora* and five of *Boarmia* are then cited by name, without description. Good specimens labeled with these names are contained in the collection.

"Acidalia junctaria," vi., 39. The specimen so labeled seems to be *Corycia vestaliata* of Guenèe.

"Macaria? subapiciaria," vi., 40. The specimen so labeled is a true *Macaria*, and is the same species as *Boarmia inordinaria* Walker, cited merely by name on the previous page.

"Melanippa propriaria," vi., 40. The specimen is *Baptria albovittata* Guenèe.

"Coremia? palparia," vi., 40. The specimen so labeled is a species of *Bomolocha (Hypena)*, and evidently owes its specific name to its long palpi, so characteristic of *Hypena*.

"Cidaria lactispargaria," vi., 41. This insect is a brown species of *Cymatophora (Boarmia)*, with a white flecking on the transverse posterior line of the primaries.

"Botys magniferalis," vi., 41. This specimen is *Botis illabilis* Hüb.

The above species are all that are described in these two papers. The entire collection contains 193 specimens labeled as belonging to 149 species by Mr. Walker. A large proportion of the names given accord with names now accepted for the species. The following are exceptions, and it may be found here that in some instances Mr. Walker's specific names have priority.

"Leucania insueta." The specimens so labeled belong to *Heliophila commoides* (Guenèe).

"Hydroecia lorea." This is not Guenée's species, but is *sera* of G. & R.

"Hydroecia ligata." This is *Hydroecia lorea* Guenèe.

"Nonagria? intractabilis." This is *Eustrotia albidula* (Guenèe).

"Mamestra ordinaria." This is *Hadena devastatrix* (Brace).

"Mamestra unicolor." The specimen is *Agrotis clandestina* (Harris).

"Apamea finitima." One of the specimens so labeled is not Guenèe's species, but is *Mamestra lilacina* Harvey.

"Apamea glaucovaria." This specimen is *Mamestra albifusa* (Walker) of Grote's List (the same as *chenopodii* var. Speyer).

"Homoptera contracta" is *Homopyralis tactus* Grote.

"Homoptera herminioides." The specimen is in poor condition, but is clearly referable to *Epizeuxis*.

"Plusia aerea." This specimen is not Hübner's species, but is *P. aereoides* Grote.

"Nephelodes signata." The specimen is *Hydroecia semiaperta* Morr., and belongs to *Tricholita*.

"Agrotis jaculifera" is not Guenée's species, but is *herilis* Grote.

"Calocampa vetusta" is *Calocampa nupera* Lintner.

"Agrotis spissa" is *Agrotis messoria* Harris.

"Agrotis illata" is the species determined as *Hadena suffusca* Morr.

"Herminia concisa" is *Epizeuxis aemula* Hübn.

"Herminia cloniusalis" is *Bleptina caradrinalis* Guen.

"Herminia clitosalis" is a specimen of the same species without the black stigmata.

"Herminia n. s.?" is *Zanclognatha laevigata* Grote.

"Herminia cruralis" is not Guenée's species, but *laevigata*.

"Bleptina surrectalis" is *Pseudoglossa lubricalis* (Geyer).

"Hormisa effusalis" is *Epizeuxis aemula* Hübn.

"Pellonia successaria" is *Haematopis grataria* Fab.

"Balsa obliquifera" is *Nolaphana melana* (Fitch).

"Hypena cacalis" is *Scoparia centuriella*.

These determinations may prove of value in settling some of Mr. Walker's unrecognized descriptions of North American moths.

DESCRIPTION OF A NEW SPECIES OF PAMPHILA FROM COLORADO.

BY W. H. EDWARDS, COALBURGH, W. VA.

Pamphila Snowi.

Male—expands 1.1 inch.; size and shape of *Leonardus*, the hind wings somewhat less prolonged anteriorly.

Upper side of both wings light glossy brown: primaries have five translucent spots, namely, one sub-apical, oblong, narrow, cut into three equal parts by the subcostal nervules: three discal, the first being at the top of the upper median interspace, small, semi-oval; the next large, irregularly quadrate, crossing the next lower interspace, and the third on sub-median interspace, less transparent, more yellow, in one example clearly defined, sub-triangular, in the other diffuse: these three spots forming an oblique line back of and below the cell; the fifth spot is at

the outer end of the cell, a narrow transverse bar; the stigma long, narrow, a little sinuous on the middle, black, edged in the middle by rough dark brown scales on either side.

Secondaries have an abbreviated discal row of indistinct, small yellow spots, placed nearly parallel to the hind margin, and restricted to the discoidal and median interspaces, or very nearly so; in the middle of the cell a small yellowish spot, almost obsolete; fringes cinereous, those of secondaries lighter than the others.

Under side of both wings brown with a russet tint; primaries somewhat fuscous near base, in and below cell, and pale yellow in the submedian interspace; the spots repeated except the lower of the three, which is lost in the color of the interspace just mentioned; secondaries have the discal spots more distinct, yellowish, and there appear faint traces of obsolete spots which would complete the series to costal margin; the cellular spot small, distinct, rounded.

Body above brown, below the thorax gray-brown, about the collar yellow tipped; abdomen yellow-gray; legs brown; palpi sordid white, gray at tips; antennae fuscous above, grayish below; club fuscous for a narrow space on upper side, elsewhere russet.

From 2 ♂, sent me by Prof. F. H. Snow, and taken by him in Colorado, at Ute Pass, while in charge of the Kansas University Scientific Expedition, 1876. No others were taken, as I am informed.

The species is near *Leonardus*, from which it differs in not having the basal area of primaries fulvous, in not having two spots near hind margin in the discoidal interspace, in having the spots translucent instead of fulvous, and in having a distinct spot at end of cell; the stigma of *Leonardus* differs considerably also, being heavier, somewhat curved, and especially broken in on the lower median nervule, of which the posterior part is thrown back of the line of the remainder; the spots on disk of secondaries in *Leonardus* are placed as in the present species, but are larger, and either quite distinct or largely diffuse, examples varying. The under side of *Leonardus* is more red (cinnamon-brown), and the series of spots on secondaries is complete and distinct, as is also the cellular spot. In these wings the resemblance between the two species is closer than elsewhere. They form a very interesting group.

ERRATA.—On p. 6, vol. 9, second line from top, for 40° read 4°, and on p. 8, second line from bottom, for *distance* read *distinct.*

Fig. 1.

THE LUNA MOTH.

Actias luna Linn.

THE LUNA MOTH--*Actias luna* Linn.

BY THE EDITOR.

In No. 8, Vol. 7 of our journal, there is an interesting article on this beautiful insect by Mr. R. V. Rogers, of Kingston, Ontario. When that appeared we were unable to supply an illustration of the moth, but lately we have succeeded in obtaining a very beautiful one drawn and engraved expressly for our pages.

This moth (Fig 1) measures when its wings are spread from 4¾ to 5½ inches. The wings are of a delicate green color, thickly covered with pale hairs as they approach the body. There is a purplish brown stripe along the front margin of the fore wings, which stretches also across the thorax, while a small branch of the same is extended to the eye spot near the middle of the wing. The eye spots are transparent in the middle and margined with rings of white, yellow, blue and black. The hinder edges of the wings are bordered with purplish brown.

The head is white, while the beautifully pectinated antennæ are of a brownish tinge. The thorax and abdomen are whitish or greenish white, thickly clothed with a woolly down, the former crossed by the purplish brown stripe already mentioned. The legs are purplish brown.

This lovely creature is not at all common in the neighborhood of London; indeed it can scarcely be called common anywhere in Ontario, although it is very widely and generally distributed. Seldom a season passes without some being captured in our midst, and occasionally we have had them fly in at the windows at night, attracted apparently by the light.

The larva, which is of a bluish green color, feeds on Hickory, Walnut, Butternut, and sometimes on Beech and Oak, and closely resembles that of *polyphemus*, from which it may be distinguished by its having a pale yellow lateral stripe, bands of the same between the segments, and a brown V-shaped mark on the terminal segment.

For fuller details we refer our readers to Mr. Rogers' excellent paper.

SUPPLEMENTARY NOTES UPON ARGYNNIS MYRINA, WITH MENTION OF THE SPECIES BELLONA, ATLANTIS AND CYBELE.

BY W. H. EDWARDS, COALBURGH, W. VA.

I was again in the Catskills, 18th August, this season, and remained there till October. On 20th August I found *myrina* abundant, and easily obtained eggs, laid 21st. These hatched 29th. The larvæ passed 1st moult 6th Sept., 2nd moult 11th, and by 20th had become lethargic, gathering in small clusters on the leaves which I gave them. A second brood hatched 22nd Sept., from eggs laid on 8th. Time 14 days, or nearly double that of the other brood. These larvæ also reached 2nd moult and became lethargic. Still another brood I obtained a week later, and when I left the mountains these had not reached the 2nd moult, but lingered after the first. The weather was cold, and though the larvæ fed, their periods were greatly retarded. I was endeavoring to see if the latest broods of the year might not perhaps hybernate immediately after the egg, as those of *cybele* do. But I discovered nothing to lead me to conclude that such was ever the habit of this species. These last larvæ were not living when I again reached Coalburgh.

The latest female *myrina* which I saw on the wing was on 16th Sept., but not having a net with me, I was unable to take her.

Argynnis bellona was less abundant, and at first seemed extinct, but I discovered that it frequented certain spots, especially where a particular species of *Solidago* grew, showing a great partiality for the flowers; and by often visiting these places, I obtained several females. These laid about fifty eggs on violet. First eggs 23rd Aug., and they hatched 31st. The larvae passed 1st moult 6th Sept., 2nd 11th, and some of them passed the 3rd moult 20th Sept. A few days after, both those which had passed the 3rd, and the others which had stopped at the 2nd moult, became lethargic. But I had sent some larvae of same lot, in their first stage, to Miss Peart, at Philadelphia, and all of them went on to chrysalis and imago.

A second brood of *bellona* from eggs laid 31st Aug., went on to 2nd moult, and all these became lethargic; and these, as well as the others, and the larvae of *myrina*, I have here at Coalburgh.

Bellona, in all its preparatory stages, is closely like *myrina*. The egg is of the same pattern, but rather longer, and the sides are less rounded; the larvae in first stages can scarcely be distinguished; in the last the spines of second segment are not lengthened as in *myrina*.

Atlantis was abundant, but the females set on violet laid no eggs, and I found on dissection that their eggs were yet immature. On 24th Aug. I took a pair of *atlantis* in copulation. It was in the forest, five miles from home, and I tied the pair in my net and suspended it on a tree. The next day, on returning, I found the pair separated, and brought the female home and set on violet. Two days after, 28th, there appeared to be but a single egg laid. The next day I discovered another, and by the 31st she had laid about a dozen, and I compassionated her endeavors and let her fly away. I kept all these butterflies alive on sugar and apple. The eggs hatched in 17 or 18 days. At the same time, I obtained a large number of eggs from other *atlantis*, which duly hatched. All the larvae forthwith began their sleep, as do those of *cybele* and *aphrodite*, *diana* and *idalia*, and that on empty stomachs, for as a rule they eat nothing.

And inasmuch as *atlantis* deposited eggs but a few days after copulation, and *myrina* does almost immediately after, we get light on an early brood of *cybele*, &c. For Mr. C. G. Siewers, of Newport, Kentucky, wrote me last summer that he had taken two pairs of *cybele* in copulation, in July. I think it probable, therefore, that these large species are digoneutic in West Va. and the Ohio Valley. The early brood of *cybele* (butterflies) appears in great force here by 1st June, on the clover blossoms, first the males, and in a few days the females. After the 15th to 20th June, they disappear, and in July I scarcely ever see an example. By 15th August fresh males appear again, and soon after fresh females, and I can always obtain eggs between 1st and 20th Sept. Just so with *aphrodite*. I should not have doubted there being two broods were it not for the fact that the several stages of the larvae which feed in spring are so remarkably prolonged that it seemed unlikely that between 15th June and 15th Aug. the several stages of egg, larva and chrysalis could be passed; and furthermore, that I had repeatedly dissected females of *cybele* in June, and when I could obtain them, in July and first half of August, and never yet found the least appearance of a formed egg. Nothing but fatty masses to represent them. But suddenly, about the middle of August, the eggs begin to take shape, and in a week or ten days are ready to be laid. But the hot weather of July and August, the mercury constantly running

between 80 and 95 in this region, and the nights (in which these larvae principally feed) being warm, may accelerate all the preparatory stages. While the evidence from dissection is but negative, Mr. Siewer's evidence, on the contrary, is positive, and if copulation takes place, we may be pretty sure that eggs follow.

BOOK NOTICES.

The Rhyncophora of America north of Mexico, by John L. LeConte, assisted by George H. Horn. From the Proceedings of the American Philosophical Society, Vol. 15.

This work, which fills a volume of 455 pages, is probably the most important contribution which has been made to the Entomology of America for many years. Its production must have been attended with immense labor and long and careful study. In addition to the work of classifying this numerous and difficult group of insects, a very large number of new species are described. We tender our sincere thanks to the authors for their kindness in sending us a copy of this useful and long needed memoir.

Manuscript Notes from my Journal, or Illustrations of Insects Native and Foreign; Order Hemiptera, sub-order Heteroptera. By Townend Glover, Washington, D. C.

In the 12th No. of Vol. vi., we called the attention of our readers to the issue of a valuable work by the same author on Diptera. The volume now at hand on the Hemiptera is published in similar form and style, quarto on heavy paper, printed on one side only, and the text a fac-simile of the author's handwriting. In this volume there are ten excellent plates, nine of which are devoted to the illustration of the species to which the notes refer, and one to the figuring of those portions of the insects on which their classification is based. There are figures of 238 species, many of the smaller ones in duplicate, one showing the insect magnified, the other of the natural size. In addition to the plates and their explanatory matter, there are 134 pages of text, 2 explanatory, 17 devoted to the classification of the Hemiptera, and the remainder to notes on the insects

themselves, their habits, the animal and vegetable substances they injure, the remedies used for destroying them, &c., all being referred to in alphabetical order.

This work is another evidence of the indomitable perseverance of this energetic Entomologist, and will be a valuable aid to those who desire to study this hitherto much neglected order. The author has again placed us under deep obligation for his kind remembrance of us.

Report on Insects Introduced by means of the International Exhibition, by Dr. J. L. LeConte, Dr. Geo. H. Horn, and Prof. J. Leidy. From the Proceedings of the Academy of Natural Sciences, Philadelphia, pp. 5.

We are glad to learn from the report of this committee that the insect pests observed among the grains, seeds, &c., exhibited, are chiefly such as are already known among us, and that there is not much likelihood of any great injury resulting to any agricultural product from the introduction of new enemies from this source.

The Rocky Mountain Locust; being report of proceedings of a conference of the Governors of several western States and Territories, together with several other gentlemen, held at Omaha, Oct., 1876, 8vo., pp. 58.

We are indebted to our esteemed friend, C. V. Riley, for a copy of the above pamphlet, which contains much valuable information on the habits of this destructive pest, as well as a summary of the best means yet known for counteracting its ravages.

Life Histories of the Birds of Eastern Pennsylvania, by Thomas G. Gentry, Vol. 1.

This is an octavo volume of 394 pages, published by the author, who resides in Germantown, Philadelphia. It is a thoroughly practical work, dealing largely with the habits of the various species of birds as observed by the author, who describes their nests and eggs, gives very full and explicit information in reference to the character of their food, the results of careful and repeated observation in the fields and woods. It is this feature that lends a special charm to this interesting little book, which is written in a very pleasing style and supplies a want long felt. We heartily commend it to all our readers who are in any way interested in Ornithology. The 2nd volume, which will complete the work, will be issued shortly, and may be obtained from the Nautralists' Agency, Salem, Mass.

CORRESPONDENCE.

DEAR SIR,—

Mr. Behrens *(p. 200, Vol. 8)* writes: "Mr. V. T. Chambers is satisfied to get Tineidæ dead and dry, and even untouched by a pin." "Satisfied" in this connection is almost too strong a word, and may be misleading. So a distinguished Lepidopterist of Europe has made an objection to my work on the ground that I only keep specimens packed in cotton, and that, unpacking them, I place them under a microscope and prepare my descriptions from the appearances thus presented. This statement, like the preceding by Mr. Behrens, comes from a misapprehension of the facts. I prefer always to have some of my specimens on pins and some of them with the wings spread. It is best to study them pinned and not pinned, spread and not spread. When the opportunity offers, I prefer in the first place to observe them closely alive, before I take them, and when the quantity of material suffices, I also examine them both spread and not spread after they are dead, with the eye, a simple lens, or a compound microscope, according to circumstances. Indeed, in by far the greater number of new species described by me, the insects have been examined not only in the conditions above mentioned, but have also been dissected; as is evident not only from the published accounts of the neuration of the wings, but much more by the multitude of drawings of the neuration now in my possession. All of my Tineina from Texas and from Canada, and nearly all that I have received from Miss Murtfeldt, from St. Louis, have come pinned and spread. Mr. Behrens wrote to me that he preferred not to undertake the task of pinning these little things, and besides he had not time, and I replied that I would be glad to get them packed in cotton without pinning; and all of his specimens have been sent in this way. I have also received a few specimens from one or two other Entomological friends in the same condition. This mode, however, does not answer for sending Tineina for any considerable distance. The antennæ, palpi and tufts of scales on the wings or elsewhere are almost invariably rubbed off, and the insect is otherwise worn and denuded, so that I have not attempted to describe one specimen in ten that has been received in this condition. This plan, or rather a modification of it, answers better for preserving Micros taken at home, and which do not have to be shipped. Of the greater number of my Tineina I have not attempted the preservation of many specimens at a time. Making but few exchanges, I have kept but very few for that pur-

pose, and for my own use, after using a sufficient number and in various conditions for generic and specific diagnosis, I have contented myself with keeping a few, not *packed* in cotton, but simply laid on a loose tuft of cotton, in a pill box, which being set away in the cabinet, the insect remains as perfect as when first placed there. Such specimens, if needed for future observation, I take by the legs in the stage forceps of the microscope, and they are in good condition for observation either under the microscope or without it, as they may by means of the forceps be conveniently turned and handled without danger of breaking them, and every part of the insect may be well observed unless—as sometimes happens—the wings are so perfectly closed as to conceal the upper surface of the abdomen. But these are simply specimens preserved for future reference. A few specimens of *very* rare species I have not attempted to pin and set because of the danger of injury to such rare species. A few others of the smallest species (as e. g., some *Nepticulæ*) I have treated in the same way, because of the certainty of injury, if not of absolute destruction, in the attempt to pin them. But in other cases my descriptions have been prepared from observations of numerous specimens in various conditions as to preparation. I have found the species which I have described from this locality very numerous, so that a morning's ramble any day from May 1st to November 1st will supply me with specimens of fifty species, and half a bushel of mined leaves. I have, therefore, not felt the necessity of preserving pinned specimens of such species. Indeed, some years ago I seldom took the trouble to pin and spread common species at all. In a series of specimens the wings of some would be found in one position, some in another, or more frequently I would separate the wings entirely from the body. But a few years ago I began to make a collection to be preserved as types of all my species. These were all pinned and spread. Unfortunately, during my absence in Colorado, the greater part of this collection was destroyed. One or more specimens of the greater number of species were fortunately preserved, and most of the other species can be supplied. This collection is now in the Cambridge Museum. It contains types—pinned and spread—of something over 200 species.

There are, however, serious objections to pinning and spreading many Tineina. Very few persons are able to make a good "mount" of the small species: it is well nigh impossible to do it without *some* denudation, and an amount of it which could not be appreciated in a larger moth, is ruinous in one of these little things. Many species are characterized by

tufts of raised scales, which are very likely to be removed in the attempt to mount them: and frequently the distinguishing specific characters are to be found either on the extreme margins of the wings, or in the apical ciliæ, just where they are most likely to be removed or injured in pinning: the thorax, of course, is destroyed in small species It is therefore best to make very careful observations before attempting to pin a "Micro." If a species is very rare, so that I desire to keep the specimen, I should want it pinned and spread; but if it was unique and small I should not run the risk. And when one keeps a cabinet of pretty curiosities, of course they are best pinned and spread. But for the purpose alone of scientific study or description, I would prefer the untouched insect, and except for the preservation of types, would deem pinning unnecessary.

V. T. CHAMBERS, Covington, Ky.

NOTES ON HYBERNATING BUTTERFLIES.

In No. 4, Vol. 7, of *Psyche*, Mr. Scudder gives some notes on early spring butterflies at the White Mountains, noticed during June 2nd to 5th. Speaking of *Vanessa J-album*, he says: "One or two specimens only were seen on the 4th, apparently just out of winter quarters; they appear later I believe than other hybernating Praefecti, and those seen were on the sunny side of a barn which had probably served as their winter refuge."

In this locality, as elsewhere, *V. antiopa* is the first butterfly seen in spring, but as far as my experience goes, *J-album* appears as early as *milberti* and the *Graptas;* I am not sure about *P. cardui* and *huntera*. Referring to my note book, I find the following dates for *J-album:* April 18th, 1874, one specimen observed; April 26th, 1874, a pair taken in *coitu;* May 14th, 1876—cold, late spring—a specimen taken at willow blossoms. *Antiopa* makes its appearance here as soon as the snow has melted off sheltered spots on the south-western slopes of Montreal Mountain. The earliest record I have of its appearance is April 4th, 1875; on that date I saw a specimen on the wing and found two others under a stone. *Antiopa* can be found under stones, on dry sunny slopes with scattered trees, every spring, but I never met with any other species in its winter quarters. Do they hybernate in places less exposed to the influence of the early spring sunshine? If so, may not this account for their appearing a week or two later than *antiopa?*

F. B. CAULFIELD, Montreal, P. Q.

The Canadian Entomologist.

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METAMORPHIC CHANGES OF PLATYSAMIA CECROPIA.

BY THOMAS G. GENTRY, PHILADELPHIA, PA.

In the early part of May, 1876, I secured a newly-developed female moth of the above species to a branch of the common red currant *(Ribes rubrum)*. It was about seven o'clock in the evening of May 6th, to be more precise in regard to time. On the next morning, I visited the spot, and a lusty male was discovered in coition. This condition of things continued until the close of the day, when her amorous partner, lured by the presence of dusky night and midnight revels, gradually loosened his embrace, and hied him away to other scenes. During the night some fifty eggs had been laid, which continued to be deposited at intervals during the succeeding day, until the number had reached about seventy. These eggs were not arranged with any view to order, but were agglutinated in masses to the reposing surfaces, or appeared in small isolated patches.

They were beautifully elliptical in contour, and measured one-eighth of an inch in length, and one-twelfth in width. The thickness was about one half the width. They were yellowish-white in color, and thickly coated with a brown viscid secretion.

These eggs did not hatch until June 3rd. Another batch was laid by a second female on the night of May 9th, which hatched on the same day as the first. A third lot by another female was deposited on the 22nd of the same month, which hatched on the 6th of June, just three days after the first and second lots. During favorable weather I have known the eggs of *cecropia* to develop in six days. This being the case, it is evident that the necessary conditions were wanting in the above-cited instances. A temperature ranging from 80 to 90 degrees of Fahrenheit thermometer, and a comparative freedom from undue atmospheric moisture, are essential conditions.

At the time when the above deposits were made, the weather was more or less cloudy, and both light and heavy rains were of frequent occurrence. Such was its unfavorableness, that fears were entertained of the complete failure of my experiments. On many occasions, eggs were broken, and their contents examined with very strong magnifying glasses, to ascertain whether putridity had taken place. Within a week of the time of hatching, numerous eggs were examined, and the only evidence of change apparent, was a slight turbidity of their contents. The weather for a day or two previous had been exceedingly fine, and the heat rather powerful. This happy state of things continued with slight, unimportant changes, until the hatching process was over. Eggs, as well as chrysalids, can endure a strong degree of cold without injurious effects, provided transformation has not already commenced, when vitality receives a check from which it never recovers. An alternation of wet and dry, or of extremely cold and very warm weather, is exceedingly detrimental. May it not be that the extreme paucity of certain kinds of insects during some years is due to the causes which have just been noticed?

The caterpillar of this species (when hatched) is nearly three-sixteenths of an inch in length, and scarcely thicker than an ordinary darning-needle. Its general color is a jet black. It is armed with two dorsal rows of glossy black spiniferous tubercles, those on the second and third somites being the largest; and also two lateral rows on each side, making six in all. The antennæ are short, black, triple-jointed, and moderately tapering. The true legs are black, three-jointed, and armed with short, in-curved claws; the pro-legs occupy the 6th, 7th, 8th, 9th, 10th and anal segments, and are furnished with a double row of black ciliæ.

June 10th—First moulting takes place. The caterpillar now measures nearly one-half of an inch. At first, it is greenish-yellow, but gradually changes to a yellowish-brown, with a slight tinge of green when perfectly dry. The caput and star-crowned protuberances still remain a beautiful glossy black. Each somite, between the different rows of tubercles, is diversified with a pair of black spots which ultimately become conjoined, forming longitudinal lines throughout their entire length. Between the segments, they are continued as obscure bands.

With age, the color becomes a dark yellowish-brown. At this stage, the caterpillar ceases to feed, and becomes considerably shortened. It is

now perfectly inactive, and behaves as if dangerously ill. This state of things lasts for a couple of days, during which time the larva has completely changed its skin, and gathered strength for future labor.

On thrifty plants of the red currant growing in the sunlight, development is very rapid; whereas, caterpillars feeding upon plants growing in the shade, exhibit the most remarkable contrasts, even in the same brood. The latter are more slender, being one-eighth of an inch shorter, darker, and have olive-green constrictions. The head and tubercles are an obscure black; the body bands much darker. From careful watching I am satisfied that they pass into their next stage without the necessity of moulting.

June 18th—The caterpillar has changed its skin again. It now measures from seven-eighths to one inch in length. The time of changing apparently varies from five to eight days, depending upon individual vigor.

The general color, at first, is a light yellowish-green. The tubercles of the first somite have each a dark basal annulus, and a pale blue summit which is surmounted by seven black spines, six in a circle and the remaining one occupying an apical position, from which it projects either vertically or obliquely; the remaining tubercles upon the first segment are jet black, and furnished with six spines. The second and third series of dorsal tubercles are a deep flesh color, with spines similar in number and position to the foregoing. The 4th, 5th, 6th, 7th, 8th, 9th and 10th somites have lemon-colored tubercles, with black, longitudinal dashes, facing laterally; and the 11th segment is armed with one large tubercle, occupying a median dorsal position, which is surrounded by a circle of seven spines near the middle, and overlooked by two divergent terminal ones.

The lateral tubercles of the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th and 11th segments, are glistening and bluish. The 2nd and 3rd are armed with six encircling spines, and one apical; while the others, with five, and, sometimes, six encircling spines. Each tubercle is marked with longitudinal dashes on both sides, or merely on the dorsal side. The 12th segment has four light blue tubercles, armed with six spines. Above the anal pro-legs, two light blue tubercles are visible, which are furnished with six black glossy spines in a circle, and two broad lateral dashes.

The four abdominal pro-legs have each a broad, irregular, quadrangular black patch, near the distal extremity, and a small semi-elliptical one near

the proximal end. The anal pro-leg on each side has two long, broad, oblique bands, inclining anteriorly.

The median dorsal line is marked with black dots which are arranged as follows: 3rd segment, posteriorly, a small dot; 4th, two very small dots; 5th, 6th, 7th, 8th, 9th and 10th segments, both fore and aft, two large jet black dots.

Between the dorsal and lateral tubercles, the arrangement is as follows: 1st segment, one linear, transverse dash, posteriorly; 2nd to 10th inclusive, both fore and aft, each two nearly circular dashes; 11th, one posterior dash.

Above the sub-lateral tubercles, exists another row. The 2nd and 3rd segments have each one in front; 4th to 11th inclusive, each one small dot in front of a larger one. Below this row, between the pro-legs, there is also a small dot on each of the several segments.

Each of the 1st, 2nd, 3rd, 4th and 5th segments, below the sub-lateral row of tubercles, bears a single jet black tubercle, which is armed with a single spine, or a pair of divergent, similarly colored spines.

The true legs are black, conical, 3-jointed, and armed with a single black incurved claw. The pro-legs, with a semi-circular row of black ciliæ, inwardly.

The head is lemon-colored, with two black, irregularly elliptical spots anteriorly, resembling eyes, which have a small triangular shield between them. There are also two smaller spots near the proximal end of the 3-jointed, conical antennæ. The basal joint of the latter organ is sub-truncate and lemon-colored; middle, small, cylindrical, and concolorous; and apical, setiform, hairy, and blackish. Upper lip, bi-labiate, greenish, and black on margin. Jaws and lower lip similarly colored with the upper lip; palpi, 3-jointed, each joint being dark brown, with a greenish annulus near their lines of union.

Before moulting, the caterpillar assumes a bluish-green color. The dots of the dorsal row become smaller, the posterior dots, partially or entirely, disappearing. The tubercles upon the first segment become a jet black; dorsal tubercles upon the 2nd and 3rd segments, a reddish purple; lateral pair, a glossy black with bluish tinge at apex; and the others, a beautiful black. The remaining dorsal tubercles are deep yellow, and have broad black patches on the sides, which are confluent posteriorly in certain cases. Lateral tubercles, black on the inferior two-thirds, and

bluish above. Sub-lateral, jet black, with pale blue apices. The dots between the dorsal and lateral rows of tubercles are much smaller than formerly, and have actually disappeared in several instances. Between the lateral and sub-lateral rows they are nearly gone in front, and entirely so behind. Upon the abdominal pro-legs they are broader below, and rapidly diminishing above. On the anal pro-legs, the two confluent spots have separated and grown elliptical in shape. That upon the head is somewhat longer and broader.

The jaws, lips and palpi have become more conspicuously colored, approaching the color of these parts in the mature caterpillar.

The spiracles, which all along occupied a middle lateral position on the 1st, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th and 11th somites, but, without being easily recognized from resemblance in color to surrounding parts, are now quite conspicuous. They are narrowly elliptical in contour, with the longest diameter arranged transversely, and have cream-colored centres with black borders.

The general color of the caterpillar upon the inferior surface, is a bluish green, with obscure patches of black between the segments. Along the middle of the dorsum, extends an obscure bluish band from the head almost to the last segment.

The caterpillars, at this stage, vary considerably in the time of moulting. Some reach this period much sooner than others, at least two days earlier, even in the same brood. It is the thrifty-looking caterpillars that are thus favored. The ill-favored ones contrast quite remarkably with the latter, in size, color and markings. A number of caterpillars was purposely confined to a bush of the red currant, whose leaves were small and sickly-looking. They throve poorly, increasing but slowly in size, while their more fortunate companions of the same brood fairly outstripped them in size and vigor, and actually passed through an entire transformation in advance of them. At the start, they had no advantage over their brethren; all were favored alike. What could have wrought the difference? From the foregoing facts, the conclusion is irresistible that nutrition had been the force at work; the vigorous larvæ, being amply supplied with food of the very best quality, had rapidly added to their size; while their stunted companions, being supplied with plenty of innutritious diet, had remained almost stationary.

June 26th.—The caterpillar has moulted for the third time. Its length

is one and three-fourth inches, and thickness nearly one-half an inch. The color of the middle dorsal line is bluish-green, and of the lateral walls, a beautiful pea-green. The dorsal and lateral dots and blotches have entirely disappeared, as well as those upon the pro-legs and spine-bearing tubercles.

The tubercles upon the 1st segment are a light blue, bordering upon pearl; concolorous with those upon the lateral and sub-lateral abdominal rows. Their spines still retain the primary black. The 2nd and 3rd segments have dark purple tubercles above, while the 4th, 5th, 6th, 7th, 8th, 9th and 10th pairs of dorsal tubercles, are a deep lemon. The 11th segment has one large central tubercle, equal in size to those upon the 2nd and 3rd segments, which are larger than the others. The 12th and 13th dorsals are a pale blue.

The pro-legs and true legs are yellowish green, except the lower part of the distal joints of the latter, which are similarly colored with the claws.

Upon each side of the caput, near the base of antennæ, are two dark spots. General color of head, pea-green; mouth appendages, light blue.

The under surface of the caterpillar is a light green.

July 4th—The last moulting occurs. The length is two and one-half inches, and the thickness one-half an inch. As soon as the skin is changed, the dorsal tubercles of the 2nd and 3rd segments, are yellowish brown, with a lower circle of eight black papillæ without spines, and a circle of six spines above, surrounding a central one. Fourth pair of dorsal tubercles yellow, with eight black warts near the base, and a circle of six black spinules above, surrounding a central terminal one; 6th, 7th, 8th, 9th and 10th each with two horizontal spines; 5th, with five spines arranged in the form of a pentagon; 11th, yellow, with a circle of six spines, near the base of which, anteriorly, are several irregular black blotches.

On the anterior margin of the 1st segment, in line with the dorsal tubercles, exist four blue wart-like prominences.

The 2nd and 3rd lateral tubercles are light blue, each furnished with a circle of six spines, surmounted by a central spine; 4th, a circle of four and one central; 5th, 6th, 7th, 8th, 9th and 10th, blue, with one central spine.

Sub-lateral tubercles, below spiracles, same size as the laterals, hairy, 2-spined, with rudiments of a second pair in some cases. Below these,

on the 2nd, 3rd, 4th and 5th segments, exist small blue tubercles tipped with double spines. On the 12th segment, alternating with dorsal and lateral rows, there are four blue tubercles, with a circle of six black spots near their base, and a circle of four spines and one central on the dorsal tubercles, and a circle of four spines on the laterals. In line with the dorsals, two blue tubercles with five black spines, two of which in some cases have nearly disappeared.

True legs, greenish yellow, with black incurved claws; pro-legs, greenish-yellow.

Spiracles narrowly elliptical, with pearly centres and black margins.

Antennæ, cream-colored, tipped with brownish, and having two dark kidney-shaped spots near their base. Upper lip, pearl-colored and deeply cleft; lower lip, similarly colored; palpi, short, hairy, and marked with dark brown blotches; jaws, pearly at base, and dark brown for the anterior two-thirds.

General color above, greenish blue; on the sides, pea-green, and of the same color below.

In many cases, the lateral and sub-lateral tubercles are a beautiful pearl color, which appears to be due to the character of the food, for it is a noticeable fact that the majority of the caterpillars which exhibit this color-change, are found feeding upon the leaves of the common plum (*Prunus domestica*).

July 21st—The larvæ commence to spin their cocoons. This requires a period ranging from three to four days. While the operation is in progress, a slight incision is made through a cocoon, which is instantly repaired. Three times is the experiment performed, and as many times is the cocoon mended. But the fourth time the caterpillar seems to take no notice of the rent, or, even if it does, it is unable to make good the damage by reason of the lack of necessary material. The cocoon being completed, the remaining efforts of the larva are spent in the rupture and separation of the epidermis, which is eventually thrust into the lower part of the cocoon. This is effected in about six days. The process is precisely similar to that which takes place in moulting.

Caterpillars in confinement, particularly in empty boxes, become exceedingly restless, and wander about for several days, as if in quest of something. This is especially noticeable in larvæ which utilize the leaves of the plants upon which they feed for cocoon purposes. Where the box

is small, and both the upper and lower surfaces are perfectly accessible, the absence of leaves is but little missed. But, on the other hand, where these substitutes do not exist, the chrysalis has been known to appear without the customary covering.

This fact seems to point to the conclusion that the cocoon is only a subsequent acquirement, which did not primarily exist. In climates where rains are of common occurrence, as protecting envelopes, they are indispensable. A chrysalis will endure a very low temperature while comparatively passive, with perfect impunity; but cannot endure excessive moisture without destruction.

Of the exact time which the chrysalis requires to develop into the imago, I can only say that it depends upon thermometric conditions; were the several larval transformations undergone in early summer, while the mercury is standing at 92 degrees, and were the chrysalis stage then assumed, it is probable that the moth would appear in about two weeks. We reason from analogy. *Actias luna* requires but a single day less than a fortnight to pass from the condition of pupa to that of imago, and surely *cecropia* could scarcely surpass this period. Cocoons that have been taken into the house in August, and kept close to a hot stove, have developed in January; while those which have been left out doors, seldom change before the middle of May. As far as I have been able to ascertain, this species is single-brooded.

Before bringing this sketch to a close, there are a few particulars which I shall touch upon, that came under my immediate notice during the season that has passed. It is a mistaken impression that caterpillars of particular species confine their feeding to certain plant-species, exclusively. During several years past, I have closely looked into this subject, and my experience has been otherwise. My observations upon *cecropia* have been both interesting and remarkable. In the neighborhood of Germantown, the leaves of the common red currant, constitute its favorite food. During the first and second stages, by which I mean the intervals before and after the first moulting, it entirely restricts its feeding thereto. But after the second moulting, it readily accustoms itself to *Ribes nigrum*, *R. grossularia*, *Prunus cerasus*, *P. vulgaris*, *Rosa blanda* and *Spiræa corymbosa*. A little later, I have tried numerous larvæ upon *Wistaria sinensis*, *Philadelphus inodorus*, *Syringa vulgaris* and *Prunus serotina*, with remarkable success. Subsequent to the last moulting, several caterpillars were induced to feed upon *Symphoricarpus racemosus*. Some cocoons which were produced by

larvæ reared upon the leaves of *Sambucus Canadensis*, are the largest that I have ever seen. They measure fully four and a half inches in length, and have a diameter of nearly three inches. They are less compact than those found upon any of the foregoing plants, being very light and considerably inflated. The chrysalis within is proportionally large. In some parts of the country, along the borders of thickets and waste fields, they are found in abundance, and thrive handsomely upon the elder. The moulting periods are shorter, and the chrysalis stage is attained at least a fortnight sooner than is usual. At first, where plants more congenial to the taste, are in close proximity, a disposition to stray thereto was discernible. To obviate this difficulty, perfectly isolated plants were selected, which proved highly successful. Frequent attempts to rear caterpillars before the first moulting was over, upon foreign plants, proved in every case an utter failure. It is doubtless true that instinct has much to do in the matter, but may it not be that the jaws and legs are so constructed at first as to be only adapted to cutting and holding on to the leaves of particular plant-species? This being so, with the further development of these organs, would certainly come the power of adaptability to take advantage of the changes thus introduced into their *environment*.

The food has certainly much to do with the color of the cocoon. Caterpillars feeding upon the leaves of the common red currant, produce silk of a deep reddish-brown color; while the leaves of the cherry, plum, and the several species of *Rosa*, give a light brown color, bordering on gray. Cocoons taken from *Spiræa*, *Symphoricarpus* and *Prunus serotina*, are invariably a grayish-brown. There is also plainly noticeable in caterpillars feeding upon these plants, with the exception of those feeding upon *Ribes rubrum*, a tendency to lighter colors, which in some cases is decidedly marked, as in the case of those feeding upon the leaves of *Prunus domestica*, where the lateral tubercles often display a beautiful pearl color.

That food has certainly much to do in determining the sexes among Lepidoptera, I think has been clearly shown in the writings of Mrs. Treat, and in those of the author, although leading authorities are disposed to think differently. But, notwithstanding their opinions to the contrary, I cannot be deterred from placing upon record my experience of the past summer with *Platysamia cecropia*. As before remarked, quite a number of caterpillars were constrained to feed upon the leaves of plants that betrayed anything but a healthy appearance. It has been already shown that

these larvæ were readily distinguished from their vigorous brethren in many particulars, such as size, color and markings. And, further, that in some cases growth was delayed, and even the time of moulting more than doubled; while, in others, either the first or second moulting was entirely dispensed with. An examination of their chrysalids reveals the startling fact that out of some twenty in my possession, all, with two exceptions, are masculine in character.

The question is often asked—Are there any checks to the undue multiplication of *cecropia* in the shape of natural enemies? I answer in the affirmative. Certain species of *aves* prey upon them. But no enemies are more destructive than two of our commonest species of spiders, *Tegenaria medicinalis* and *Agelena nævia*, the former of which constructs its web upon bushes of the red currant, using a curled leaf for a tube. I have noticed the above species on numerous occasions engaged in dragging caterpillars into its dens. It is only while the caterpillars are young, before the first moulting has taken place, that these attacks are ventured upon. *Dermestes lardarius*, in the larval state, frequently attacks the living chrysalis when divested of its cocoon, and does not cease from its ravages until it has reduced it to a mere hull. Even the chitinous covering shares the fate of the softer parts within. In a few instances, these larvæ had penetrated the only door of entrance, by gnawing their way through the comparatively loose fibres of silk which occupy the centre of the basal extremity. Their presence was only detected by the removal of the cocoon. Several cocoons which I have in a warm room have recently yielded fine specimens of the following parasites: *Ophion macrurum* Linn., *Exorista militaris* Walsh, *Chalcis maria* Riley, and *Cryptus nuncius* Say—the *extrematis* of Cresson. At least one out of every three which I raised during the past season, and the number was not short of two hundred specimens, has been infested.

The Naturalists' Directory.—This pamphlet, recently issued, will prove a great convenience to all those interested in science. It contains the names of Naturalists, Chemists, Physicists, and Meteorologists, arranged alphabetically, the several departments separately indexed. It is well printed and interleaved with blank paper, on which additional names may be written. It is published by the Naturalists' Agency, Salem, Mass.

HISTORY OF PHYCIODES THAROS, A POLYMORPHIC BUTTERFLY.

BY W. H. EDWARDS, COALBURGH, W. VA.

(Continued from Page 10.)

I have had upwards of 500 examples of the species before me in making these comparisons, most of them bred, but many taken in the field during several years past, since my attention has been attracted to the variation manifested. Many others I have brought together from localities as far apart as those mentioned. And I can well corroborate the words of Drury, applied to *tharos*, now more than an hundred years ago: "In short, Nature forms such a variety of this species that it is difficult to set bounds, or to know all that belongs to it."

In most of the comparisons above made I have used the under side of the hind wings only, for the reason that here the markings are most decided and colors most varied: but there are differences in the fore wings also corresponding much with the others. On the upper side there is more uniformity throughout the species: but, as a rule, the winter form has the fulvous portions deep red, while in the summer generations the fulvous is usually paler, and often partly replaced by yellow, as before mentioned. The 1st summer generation at Coalburgh had much less of this change in the fulvous portions than the 2nd, and the 2nd corresponded in this respect with the 1st Catskill summer generation. But the upper side of var. A forms an exception, the black being paler, almost gray, and the hind margin of fore wing edged by a narrow band which is distinctly separated from the blacker submarginal patches. Usually these are confluent and concolored with the band, making in effect a very broad black margin. The blackish net work about the base is very open, the lines fine. A appears to be an offset of B in the direction most remote from the summer form, just as in *Papilio ajax*, the var. *Walshii* is on the farther side of *telamonides*, remote from the summer form *marcellus*. On the contrary, var. C leads from B through D directly to the summer form. A is farther from this last in all respects than are several species of this genus, and were it not for the intermediate grades, I do not think it would be suspected of any close relationship to the summer form. Variety B I conceive to be nearest the primitive type. Besides that this has appeared

constantly in the butterflies changed by cold, as related, it is common in this region, predominating over the other varieties. It is also found more or less as far north as New York, though there it is not common. And moreover its distinctive peculiarity of color is seen in the allied species *phaon*, inhabiting the Gulf States, and in *vesta*, Texas, which in some degree replace *tharos* in those regions. Both these are seasonally dimorphic, and both are restricted in the winter form, so far as I can learn, to the single phase denoted by B in *tharos*. And in their summer generations, both have a close resemblance to the summer *tharos*, though owing to the increased number of summer generations in the extreme south, permitted by the length of the season, there are phases of the summer form in these species not observable in higher latitudes. It is noteworthy that these two species, the only ones, excepting *Batesii*, on the Atlantic slope especially near to *tharos* (and what *Batesii* is, whether it is not another variety of the winter form of *tharos*, is not yet settled), should be seasonally dimorphic, while of the many other species of the genus belonging to our fauna, not one, so far as is known, shows any marked difference between its winter and summer generation.

The significance of these phenomena I take to be this: when *phaon* and *vesta* and *tharos* were as yet only varieties of one species, the sole coloration was similar to that now common to the three. As they gradually became permanent, or in other words, as these varieties became species, *tharos* was giving rise to several sub-varieties, some of them in time to become distinct and well marked, while the other two, *phaon* and *vesta*, remained constant. As the climate moderated and the summer became longer, each species came to have a summer generation; and in these the resemblance of blood-relationship is still manifest. As the winter generations of each species had been much alike, so the summer generations sprung from them were much alike.

And if we consider the metropolis of the species *tharos*, or perhaps the parent species back of that, at the time when it had but one annual generation, to have been somewhere between 37° and 40° on the Atlantic slope, and within which limits all the varieties and sub-varieties of both winter and summer forms of *tharos* are now found in amazing luxuriance, we can see how it is possible, as the glacial cold receded, that only part of the varieties of the winter form might spread to the northward, and but one of them at last reach the sub-boreal regions, and hold possession to this day as the sole representative of the species. And at a very early

period the primary form, together with *phaon* and *vesta*, had made its way southward, where all three are found now, and neither of them, so far as appears, having developed any marked varieties of the winter form.

[After this paper was written, and the first part of it in type, I received from Mr. Boll a fine series of *tharos*, *phaon* and *vesta*, from Texas, with the dates of capture accompanying each example. It appears that *tharos* there flies from February to November, and there must be in all six or seven generations during this period. Five of these are represented in the series sent. All the examples of *tharos* are of small size, resembling in this respect those from the far north. All, except the February examples, which are var. B winter form, are very dark above, the black intense and the fulvous deep red, and some of the males have the under side of the hind wings almost deprived of markings of any sort, and to a considerably greater degree than I have observed in more northern examples. But certain males labeled Sept., Oct., resemble surprisingly var. C of the winter form. I find the first of these phases, that of the plain wing, also in *phaon*, and among the examples of this species is a female labeled November, that is undoubtedly the winter form, var. B, and which would be expected to appear in February, after the winter. And this has led me to suspect, considering the effect produced on the Coalburgh larvæ fed in the Catskills, as before related, that a cool season during the time the fall brood is feeding, or a few cool days after the chrysalis is formed, may tend to change the form of such of the butterflies as will emerge before winter, so that they shall not differ from those which pass the winter in chrysalis and appear in February. That may happen naturally which was brought about artificially with the Coalburgh brood spoken of.

I have also received a letter from Dr. Weismann of 16th Nov., 1876, which by his permission I may give in this connection: "Naturally your experiments with *tharos* have greatly interested me. The case seems to me perfectly intelligible: *marcia* is the old, primary form of the species, in the glacial period the only one. *Tharos* is the secondary form, having arisen in the course of many generations through the gradually working influence of summer heat. In your experiments cold has caused the summer generation to revert to the primary form. The reverting which occurred was complete in the females, but not in all the males! This proves, as it appears to me, that the males are changed or affected more strongly by the heat of summer than the females. The secondary form

has a stronger constitution in the males than in the females. As I read your letter, it at once occurred to me whether in the spring there would not appear some males which were not pure *marcia*, but were of the summer form, or nearly resembling it; but when I reached the conclusion of your letter I found that you especially mentioned that this was so! And I was reminded that the same thing is observable in *V. levana*, though in a less striking degree. If we treated the summer brood of *levana* with ice many more females than males would revert to the winter form. This sex is more conservative than the male—slower to change."]

I am at a disadvantage with this paper not to be able to give colored illustrations of the different forms of *tharos*, with the variations, as well as figures of the allied species mentioned, but I propose to do so fully in the Butterflies of North America.

It is the female of the summer form, and that variety of it which displays the brown discal patch on the under side of the hind wings, that Drury figured as *tharos*, in 1770, and exceedingly well. In some notes when the description of *marcia* was given, Trans. Am. Ent. Soc., vol. 2, p. 207, I discredited *tharos* of Drury, but wrongly, and for the reason that I had not seen the peculiar phase figured. It pleases me now to make correction. My description of *marcia* was based on the first three of the varieties designated in this paper. The 4th, D, I then knew nothing of, nor indeed should I ever have noticed it but for having bred it from the egg.

Cramer's *tharos* is stated to have come from New York, and reference is made in the text to Drury. The figures are coarsely drawn and rudely colored. Bois.-Lec. state this *tharos* to be identical with Drury's, but in his Lep. de la Californie, Dr. Boisduval says it is another insect, and he considers Drury's *tharos* not to be our Atlantic species, but a Californian which he calls *pulchella*. I received the type of *pulchella* from Dr. Boisduval, and it proved to be *mylitta* Edw., a species by no means so near *tharos* as is *pratensis* Behr, of California. *Cocyta* Cramer, ♂, fig. A, B, pl. 101, is *tharos* ♂ of the summer form, and fig. C probably is intended for female of same, but the text refers it to Surinam, and it is given with a doubt as to whether it belongs to the male figured or not. Mr. Scudder regards these as var. of *tharos* Drury. But Dr. Boisduval makes it synonymous with *morpheus* Fab., and locates it in So. California. And Mr. Butler, Cat. Fab. Lep., makes *morpheus* Fab. a syn. of *liriope* Cramer, and refers it to Florida. And Mr. Scudder rejects *liriope* as N.

Am. So that the synonymy is rather mixed, and I give the above as a sample of the difficulties caused by attempts at utilizing the illy-executed figures and indifferent descriptions of some of these old books.

However, Fabricius (Ent. Syst. 3, No. 479) describes *morpheus* as a N. Am. insect, and in language, which though brief, is applicable to the summer form of what for many years has been known as *tharos*. Parvus. Alae omnes integerrimae, fulvae, maculis margineque nigris. Posticae punctis sex nigris in strigam dispositis versus marginem posticum. Subtus anticae fulvae, nigro maculatae, posticae pallascentes strigis undatis, margine punctisque sex fuscis. And accordingly, as it is best to designate by name the dimorphic forms of any species, I call the entire species *tharos*, the summer form var. *morpheus* Fab., the winter form var. *marcia*, and take no heed of Cramer's figures.

The figures of the male *tharos* in Bois. and Lec., are not very exact either, but may be taken to represent the var. *morpheus*. But the female must have been drawn from *Batesii*, and evidently Dr. Boisduval had this insect before him when he wrote these words: "We possess individuals which we consider as varieties, of which the primaries are black, with some fulvous spots and a transverse macular band of the same color. The hind wings do not differ, *except that the lines on the basal area run together*. Beneath, *the hind wings are wholly deprived of a brown border; the fore wings have likewise a part of the border effaced, but that which remains is blacker than in ordinary individuals.*" An excellent description of *Batesii*.

My experiments have thrown no light on the position or history of *Batesii*, and inasmuch as this is certainly a winter form (though I am not yet able to say that it may not be a summer form also), and the only larvæ of *tharos* so far carried through the winter having been from the Catskills, where *Batesii* is never taken, I could not expect this last to appear among the resulting butterflies, even if it were only a variety of *tharos*. If I succeed in saving the hybernating larvae which I now have, most of which originated at Coalburgh, the point as to relationship of these species, or forms, may be settled this coming spring. *Batesii* is not common here, and I have taken perhaps a dozen examples in course of several years: all these were flying with *marcia*.

* DESCRIPTION OF PREPARATORY STAGES OF THAROS.

EGG.—Conoidal, truncated, depressed at summit, rounded at base the lower half indented like a thimble, the excavations being shallow and arranged in close and regular rows; the upper half smooth, with about 15 slightly raised vertical ribs, terminating at the rim above; color pale green. Laid in clusters on the leaves of any species of Aster. Duration of this stage 4 to 7 days.

YOUNG LARVA.—Length .06 inch.; cylindrical, largest anteriorly, the segments each well rounded; sparsely pilose, the hairs black, and on the anterior segments directed forward; color yellow-green clouded with brown; head ob-ovate, deeply cleft; pilose; color dark brown. Duration of this stage 5 to 6 days.

AFTER FIRST MOULT.—Length .1 inch.; cylindrical, stoutest in the middle segments; armed with 7 rows of short, fleshy, brown spines, each thickly set with short, concolored bristles; there is also at the base of body a row of small spines, similar to the others, one on each segment from the 3rd, and over the pro-legs two on each; the 2nd segment with a collar of minute spines; body striped longitudinally with light and dark brown and sordid white; the dorsum light brown edged with white, and on this brown area are two interrupted white streaks; on the side a dark brown stripe on light ground; and in line with the lower lateral spines a white ridge; under side, feet and legs brown; head sub-cordate, the vertices rounded, and across each a gray band; another band on front lower face; color shining black. Duration of this stage 5 to 6 days.

AFTER SECOND MOULT.—Length .22 inch.; same shape; the stripes almost the same, the white dull, the brown darker; head sub-cordate, dark brown or black; on each vertex a white spot and one on front lower face. To 3rd summer moult 3 days. Where the larva passed 3rd moult in the fall, the interval was from 7 to 14 days.

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* NOTE.—As the publication of this paper has been delayed, I am able to say now (March 24th), that the hybernating larvæ spoken of have gone through their larval changes and are now in chrysalis, 11 of them. These all had passed 3 moults last fall, and have passed 2 since hybernation ended. As will be seen below, the coloration at both these moults differed in several respects from the summer coloration. I did not succeed in bringing alive through the winter any of those larvæ which hybernated after 2nd fall moult, but of those which passed 3rd in the fall, the larger part were living when I placed them in the greenhouse, 7th Feb'y.

AFTER THIRD FALL MOULT.—Length .3 inch.; the dorsum light brown, edged with faint white at the 1st lateral row of spines, the brown area showing two macular white streaks; below 1st laterals, a black stripe, the remainder of the side brown; a white ridge with 3rd laterals; spines generally brown, the bristles same, black-tipped; head sub-cordate, shining black; with a gray, illy-defined spot on each vertex, and another on each side of face; some gray points also back of the last.

AFTER FOURTH MOULT, IN SPRING.—Length .44 inch. Body yellow-brown, dotted with yellow-white; the spines short, stout at base blunt at top, yellowish at base, brown above; the bristles short, divergent, brown, black-tipped; along the dorsal row a black stripe; a yellow stripe runs with 1st laterals, usually broken and somewhat irregular, most continuous on either side of each spine; a yellow band in line with 3rd laterals; head small, cordate, bronze or black, shining, with a few black hairs; across each vertex a narrow yellowish bar; a yellow triangular spot on front lower face, at the lower angles connecting with a curved yellow bar which runs to the back of the head.

AFTER FIFTH AND LAST MOULT, IN SPRING.—Length .6 inch. Color blackish-brown, dotted, especially on dorsum, with yellow; the spines more tapering, stout at base, blunt at tip, mostly yellowish at base; the bristles brown, black-tipped; on dorsum a black stripe, but often wanting; a yellow stripe in line with 1st laterals, and a yellow band below 3rd laterals; in some examples there is a black stripe between 1st and 2nd laterals; head bronze, shining, with black hairs; across each vertex a narrow whitish bar, thickened at the front and bluntly barbed on outer side; in front a triangular spot, connecting at the lower angles with a sickle-shaped bar on side, both yellowish. In other respects like 4th summer moult. Length at maturity .85 inch.

AFTER THIRD SUMMER MOULT.—Length .45 inch. Color olive brown; the dorsum much specked and dotted with dull white; a dull white stripe in line with 1st laterals, and a band of same color below spiracles, above which is another band, rather indistinct, whitish, macular; under side dark brown; the spines brown, light tipped, many with yellow, sometimes orange bases; the bristles black; head cordate, bronze; a straight silvery bar across each vertex; a triangular white spot in front, connected with a curved white line on either side, and white on the mandibles. To next moult 3 to 5 days.

AFTER FOURTH AND LAST MOULT, IN SUMMER.—Length .80 to .85 inch.; when mature, .90 to .95 inch. Cylindrical; color dark brown, dotted with yellow, and striped with yellow and black, the yellow always dull; armed with 7 rows of spines, 1 dorsal, and 3 on either side, besides smaller spines, arranged as after 1st moult; the spines stout, tapering, dark brown, in part white-tipped, those of 1st and 3rd lateral rows more or less orange tinted at base; each spine beset with many stout, straight, black bristles; next below 1st laterals a blackish stripe, edged on the dorsal side by yellow; in line with the lower laterals a yellow ridge; head cordate, either black or bronze; on each vertex a transverse white band; in front a cordate yellow spot, and on each side a sickle-shaped yellow stripe. Duration 4 to 6 days.

CHRYSALIS.—Length .50 inch.; cylindrical, thickest at 9th and 10th segments; head case narrow, excavated at the sides, nearly square at top; the mesonotum moderately prominent, compressed at summit, and followed by a slight depression; the anterior edges of the last four segments of the abdomen prominent, especially of the foremost, which is developed into a ridge: on the abdomen several rows of fine tubercles; the color varies, being light cinereous, covered with fine abbreviated streaks; or it may be cinereous on dorsum, the rest yellow brown: or a dull white mottled dorsally with brown; or wholly dark brown finely mottled with gray. Duration from 6 to 13 days, unless retarded by cold.

DESCRIPTION OF A NEW SPECIES OF HESPERIAN FROM TEXAS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Pamphila Meskei.

Female—Expands 1.4 inch.

Upper side blackish-brown; primaries have the costal margin to cell and nearly to apex densely covered with fulvous; the basal area and the inner margin sprinkled with fulvous scales; and the cell wholly deep fulvous except towards the outer end, where through the middle runs an oar-shaped blackish stripe; midway between cell and apex an elongated yellow-white spot, cut into three by the sub-costal nervules, the one of these spots nearest costa nearly lost in the fulvous ground; across the disk an oblique band of yellow-white spots, the upper one small and in

the upper discoidal interspace, placed a little outside the costal spot, the lower one in the submedian interspace, the spots widening as they proceed towards inner margin, and the 3rd and 4th deeply excavated on the outer side. Secondaries have the costal margin blackish like the hind margin, but the rest of the wing is sprinkled with fulvous, and the inner half covered by long dull greenish hairs; between the cell and margin an extra discal bright fulvous bar crossing three interspaces; fringes whitish.

Under side uniform bright orange, only the inner margin of primaries and a narrow space below the cell to base being fuscous; the spots on primaries faintly reappear in paler color than the ground, reduced in size, and at the end of the cell are two faint, yellow, horizontal bars, one at either side of cell. Secondaries immaculate except for two or three yellowish points corresponding to the spots of the extra discal bar.

Body above covered with dull green hairs, the collar orange, and the hairs at base of antennæ partly orange-fulvous; thorax below yellow-white, the abdomen yellow, on the sides and at the end orange; legs ochrey and yellow-white; palpi orange, as are the hairs of the collar; antennæ blackish above, yellow below; club fuscous.

From a single example in the collection of Mr. Otto Meske. The species is allied to *attalus* Edw. and *seminole* Scud., but is larger, more brightly ornamented on upper side, and beneath is not to be mistaken for any other species, owing to its bright orange surface. The male yet unknown. Taken in Bastrop Co., Texas.

CORRESPONDENCE.

I think it would be beneficial if a portion of the journal-space were devoted each month to a notice of the localities, habitats, food and habits of some of our rarer species, the best methods and apparatus for their capture, and the most approved way of putting them to death without damage, as also of pinning, setting and preserving them. These matters may seem of but slight consequence to the practised collector, but they assume an aspect of the greatest importance in the eyes of a beginner. In this connection, if Entomologists throughout the province would relate their experience in successfully collecting certain families of insects, and describe any method, implement or apparatus which they have found advantageous, and at the same time record the date, time of day, locality

and habitat of their captures, a judicious selection of the same would, I think, add much to the popularity, and not a little to the utility of the journal.

The question of the localities I consider as of very great importance, especially when united with the season at which certain insects may be expected to appear. Entomologists visiting remote sections of the country would, if such observations were duly registered, be directed whither to go in order to obtain specimens of species which might be rare or wanting entirely in their own neighborhoods. For instance, I have never captured any of the Lycænidæ, nor ever known one to be captured in the immediate vicinity of Belleville, though in Madoc, about 30 miles north, I saw them in great profusion in the middle of May, 1868. Again, *P. asterias* is very common in this town, while only a few stragglers of *P. turnus* are ever seen. In the township of Lake, about 25 miles north-west from Madoc, and a very wild district, *P. turnus* is abundant, while I did not observe a single specimen of *asterias* in three weeks of the heighth of the season.

I think it would also be desirable to give from time to time notices of works on the science, especially such as refer to the discrimination of insects, and to give a list of such books as are likely to be of service to young collectors. You will see that I am an advocate of the *propaganda*. Every collector is certain to meet with rare, and is not unlikely to capture hitherto undescribed species, and if "in the multitude of counsellors there is wisdom," so in the multitude of collections there is knowledge.

James H. Bell, Belleville, Ont.

I found in opening some *cecropia* cocoons lately, *two* pupæ in one cocoon. These were of different sex, and in opposite position as regarded the loose end of cocoon; neither was perfectly formed, apparently owing to their being crowded out of shape in the limited space. The cocoon was one of the "loose" kind; both inner and outer cocoons and floss were uniform in texture, showing no line by which the work of two larvæ could be distinguished. There was, however, a rudimentary division on the inside of the inner cocoon at its close end, partly enclosing the abdominal end of the ♂ pupa. In writing of *Ophion macrurum*, p. 220, v. 8, I omitted the word "imago." *Ophion* pupæ would hardly be a rarity, since over 20 per cent. of *polyphemus* are thus affected, but *Ophion* imago in October and November are new to me. The cocoons were kept in a cold room.

C. E. Worthington, Chicago.

The Canadian Entomologist.

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NOTES ON THE EARLY STAGES OF SOME MOTHS.

BY L. W. GOODELL, AMHERST, MASS.

Mamestra adjuncta Guen.

Larva, 1 example—Body smooth, thick and uniform to the 11th segment, from which it tapers abruptly to the end. Cinnamon brown; a large sub-dorsal, velvety, dark brown shade on the 4th, 5th and 11th rings, and on each of the remaining rings, except the three first and last one, is a dorsal curved line, and two small roundish spots of the same color; two larger, square, dark brown dorsal spots edged with yellowish-white, on the first ring. Head roundish, as wide as the body. Venter dark brown. Spiracles white, edged with dark brown. Length when full grown, 1.4 inches. Changed to a pupa Aug. 30. Feeds on *Pteris aquilina* (common brake).

Pupa—Length 0.7 inch; subterranean: black, of the usual form, with a slender forked spine. Imago, June 27.

Apatela hamamelis Guen.

Larva, 9 examples—Body of uniform thickness, with a few short, scattered, whitish hairs on the sides. The color varies from pale yellow to yellowish-red. A row of connected, triangular, dark brown spots on the back, and obscure shades and spots of pale brown on the sides. Venter bluish-green. Head round, flattish in front, as wide and concolorous with the body. When not feeding it rests with its head turned to the side of the body. Average length, 1 inch. Feeds on the Chestnut. About the last of August they make cocoons of bits of wood and grains of earth on or near the surface.

Pupa—Length 0.5 inch, of the usual form and color. Imagines appeared June 3rd to 9th.

Eupithecia absynthiata Linn.

Larva, 4 examples -Body slightly attenuated posteriorly. Color pale red; an indistinct, brownish, broken dorsal stripe on the eight middle rings, and a wavy, pale yellow line on each side. Venter and anal prolegs tinged with bluish. Head as wide as the prothoracic ring, flattish and concolorous with the body. Length when fully grown, 0.6 inch. Found feeding on the flowers of the Cockscomb (*Celosia cristata*). Sept. 28th to 30th they made rather brittle cocoons of grains of earth just beneath the surface.

Pupa—Length 0.20 to 0.24 inch; obtusely conical; wing cases and anterior part of the thorax dark greenish; abdomen yellowish-brown. Imagines Nov. 4th to 10th.

Tetracis lorata Grote.

Larva, 1 example—Body attenuated anteriorly; 2nd and 11th rings slightly swollen. Color, when about half grown, light gray, tinged with brownish and variegated with ash; when fully grown, dark brown mixed with light brown and gray. There are about eight pairs of small, pointed, black warts on the back. Head a little wider than the prothoracic ring, not retractile; brown, with two small black spots, edged below with white in front. Length when full grown, 1.2 inch. Feeds on the Sweet Fern (*Comptonia asplenifolia*). Sept. 22nd it spun a thin cocoon, mixed with bits of leaves, and was transformed to a pupa on the 25th.

Pupa—Length 0.6 inch. Thorax and wing cases pale wood color, densely speckled with brown; abdomen reddish, speckled with brown; a row of black spots on each side, and a small, black dorsal spot on the anterior part of the thorax. Caudal spine flattened and rather short. Imago disclosed Jan. 20th by artificial heat.

Ephyra myrtaria Guen.

Larva, 23 examples—Body smooth and of uniform width; reddish brown striated with ochreous; a large sub-dorsal dark brown shade on each of the six middle rings, and a darker dorsal stripe. Head round and slightly bifid, a little paler than the body and larger than the prothoracic segment. Average length when fully grown, 0.7 inch. It is very much attenuated when young and of a brighter color. Feeds on Sweet Fern (*Comptonia asplenifolia*) and on the Huckleberry (*Gaylussacia*). When about to change to a pupa it fastens its anal prolegs firmly to the

under side of a horizontal twig, and slings itself by spinning a thread of silk over the middle of its body, which is fastened by two strands at each end.

Pupa—Widest and truncated anteriorly, tapering regularly to the tail, and with two ear-like protuberances in front. Color, body very pale flesh color, with the abdomen more or less thickly spotted with black; wing cases paler than the body, with a black streak along the upper margin; a small dorsal black spot on the anterior part of the thorax.

A variety of this species, of which I found thirteen examples, is dark brown with black sub-dorsal shades, which are edged below with grayish; there are also two small black spots on the back of the first ring of the body.

ON DEILEPHILA CHAMŒNERII AND LINEATA.

BY THE EDITOR.

Both these members of the Sphinx family are found more or less plentifully in nearly all portions of the Provinces of Ontario and Quebec; *lineata*, as far as we have been able to learn, is more abundant in Ontario and *chamœnerii* in Quebec. They are both very handsome moths, and so strong and active when on the wing that it is difficult to capture them without injury. About twilight or a little later their period of activity begins, when they may be seen flitting about with spectre-like rapidity, hovering like the humming bird over flowers, into which their long and slender tongues are inserted in search of the nectar there stored.

They are much alike. In both the ground color of the fore wings is of a rich greenish olive, crossed about the middle by a pale buff stripe or bar, extending almost the whole length to the tip, while along the outer margin there is another band or stripe nearly equal in width, but of a dull ashy color. The hind wings are small, with a wide rosy band, which covers a large portion of the wing, while above and below, the color is almost black, the hinder margin being fringed with white. In the markings on the bodies they also resemble each other very much. There is a line of white on each side, extending from the head to the base of the thorax, and other less prominent longitudinal lines of white on the thorax.

The abdomen is of a greenish olive, having a reddish hue on the sides and spotted with white and black.

There are differences, however, which would enable the most casual observer to separate them without difficulty. There is a difference in size, *lineata* (fig. 3) being the largest, measuring when its wings are spread about three and a half inches, while *chamænerii* (fig. 2) rarely exceeds two and three-quarter inches. The central band on the fore wings in *chamænerii* is wider and more irregular, but the most striking point of difference between the species is that the veins of the fore wings in *lineata* are distinctly margined with white, a character entirely wanting in *chamænerii*. These differences will be readily appreciated by reference to the figures.

The larva of *lineata* varies considerably in color. Mr. Riley says: "The most common form is that given at fig. 4, where the body is of a yellowish green, with a prominent sub-dorsal row of elliptical spots, each spot consisting of two curved black lines, enclosing superiorly a bright crimson space and inferiorly a pale yellow line, the whole row of spots being connected by a pale yellow stripe edged above with black. In some specimens these eye-like spots are disconnected, and the space between the black crescents is of a uniform cream color. The breathing holes are either surrounded with black or black edged with yellow. The other form of the caterpillar (see fig. 5) is black, with a yellow line along the back and a series of pale yellow spots and darker yellow dots. This dark form is, however, subject to great variation, some specimens entirely lacking the line along the back."

According to Mr. Riley, it feeds upon purslane, turnip, buckwheat, water melon, and even grape and apple leaves, and is found in the larval condition during the month of July. Mr. Pyle, of Dundas, Ontario, has found it feeding on the common plantain. When full grown it is said to descend into the ground, where within a smooth cavity it changes into a light brown chrysalis, emerging as a moth in September.

LARVA OF D. CHAMŒNERII.

Described from three specimens found feeding on grape, July 5th.

Length, two and a half inches, onisciform.

Head small, rather flat in front, slightly bilobed, and of a dull pinkish brown color, with a black stripe across the front at base. Basal half of

Fig.

Fig. 3.

Fig.

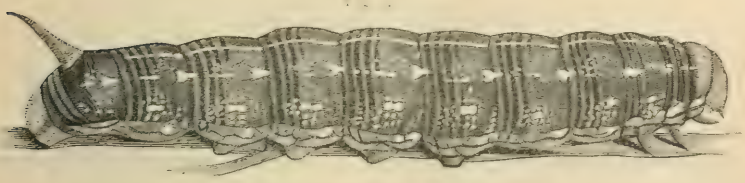

Fig.

palpi yellow, upper half black. Mandibles black, with a patch of yellow between them and the black stripe.

Body above deep olive green, with a brownish tinge and a polished surface. Second segment with a cervical shield similar in color to head, its sides dull greenish, with two yellow dots. There is a pale yellowish dorsal line terminating at the base of the caudal horn ; each segment from 3rd to 12th inclusive has a pale yellow spot on each side the dorsal line, about half way towards the stigmata, those on 3rd segment small and almost crescent-shaped, on 4th larger and nearly round, 5th still larger, nearly round, 6th, 7th, 8th, 9th, 10th and 11th about equal in size, nearly oval and larger than those on 5th. On 12th segment the spot is more elongated, and extending upwards, terminates at the base of the caudal horn. There is a wide but indistinct blackish band across the anterior part of each segment, in which the yellow spots are set ; the sides of the body below the spots are thickly sprinkled with minute raised yellow dots. Caudal horn long, curved backwards, red, slightly tipped with black, and with a roughened surface ; terminal segment dull pinkish ; stigmata oval, yellow, shaded around with dull black.

Under surface much paler, color dull pale pinkish green, the pink color predominating from 5th to terminal segments inclusive, and with a number of very minute raised yellowish dots placed chiefly along the sides. Feet black ; pro-legs pink, with a patch of black on the outside of each. One specimen spun a light web, binding a portion of the leaf in the manner of *pampinatrix*, within which it changed to chrysalis on the 10th of July, and from this the imago appeared on the 28th of the same month. The other two larvæ died before completing their transformations.

SIX NEW NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Eustrotia mariæ, n. s.

Fore wings pale carneous brown shaded with dusky ; terminal space more blackish. Median lines fine, black, approximate, angulate. A curved sub-basal shade on internal margin. Reniform narrow, outwardly curved or

oblique, white and contrasting, set in a dark suffusion of the disc. Subterminal line even, with a costal angulation. A fine dark terminal line at base of concolorous fringes. Hind wings pale, shining with traces of median shades and the fringes slightly carneous; abdomen concolorous with hind wings. Beneath fore wings dusky, hind wings pale with mesial shade. Fore wings above showing pale costal dots; beneath there are pale costal shades and the costal angulation of the s. t. line is apparently reflected. *Expanse* 21 mil.

Several specimens taken on the Lake Shore, near Buffalo, N. Y., in July, by Miss Mary Walker, after whom the species is named.

Thalpochares orba, n. s.

A large form resembling *mundula* in color and cut of wing, but stouter and with longer palpi. Its generic position is not assured. Fore wings dark brown, with the narrow median space almost black. The median lines are even, pale ferruginous brown, contrasting. The outer or t. p. line occupies almost the centre of the wing and is not angulate opposite the cell as is *mundula*, but obtusely bent. A faint festooned line follows the t. p. line. The irregular subterminal is relieved by a following pale shade. The reniform is a small ringed spot. No traces of the other stigmata. Fringes concolorous, cut outwardly with pale. There is a delicate violet reflection over the fore wings. Hind wings and abdomen blackish fuscous. Beneath fuscous with discal dots and a common even mesial line relieved outwardly by pale shading. *Expanse* 21 mil. Loc., Demopolis, Alabama.

Spragueia plumbifimbriata, n. s.

Among the specimens belonging to this genus collected by Mr. Belfrage, in Texas, are several under the number "127" which I cannot refer to *dama* or *leo*, although closely allied to these. The fringes in *dama* are orange colored with a leaden fleck opposite the cell; of *leo* lead-color except at the internal angle, where they are fulvous. In the new species they are entirely plumbeous. The thorax and fore wings at base and along costal region are very pale yellow, like the palest tint in the other two species. The rest of the wing is taken up by two broad lead-colored patches or bands, separated by a narrow rusty line at the middle of the wing from the middle to internal margin. The first band stretches narrowly to costa without the first transverse line, which is barely indicated

The discal spot is situate without and above the extremity of the mesial line, which is apparently the lower portion of the transverse posterior. The terminal margin is narrowly fulvous. Hind wings and abdomen pale fuscous, not so dark as in allied species. Beneath paler than in its congeners. *Expanse* 14 mil.

This cannot be the *onagrus* of Gueneé, which seems to me to be the same species as *leo*.

Fruva, n. g.

Although the neuration agrees with *Sprogueia*, the three forms here included differ by the bulging clypeus and the infra-clypeal plate. In *fasciatella* this is exaggerated and the surface of the clypeus is flattened or slightly depressed, reminding us of *Tarache*. The species are rather longer winged than *Sprogueia* (*argophila* of Gueneé in part) and differ by their plain unspotted fore wings. The three species I would here include are *F. tortricina* (Zell.), *F. fasciatella* Grote (which is the generic type) and the following :

Fruva obsoleta, n. s.

Allied to *tortricina* rather than to *fasciatella*, but resembling the latter more in color. The front does not seem to be shallowly depressed. Entirely plain colored. Fore wings fuscous, overlaid with ochrey scales, without markings. Hind wings pale fuscous with whitish fringes. Beneath whitish, glistening : fore wings with blackish disc and fringes, the latter whitish on secondaries. *Expanse* 19 mil. Algonquin, Illinois, June 1 ; Dr. Nason.

The species *Tarache angustipennis* comes very near *Fruva*, and may ultimately be removed to the latter genus.

Tripudia, n. g.

The little species with simple and rather short antennæ belonging to this genus are among the frailest of the family. They are dark-colored, beneath shining, and remind one of certain *Pyralidæ*. The body parts are small in proportion to the wings : the abdomen not exceeding the secondaries. The wings are wide, outwardly full. Eyes naked, palpi rather long, divaricate, pointed. All the parts are closely scaled. Tongue rather stout. Legs unarmed. (The neuration should be examined, but I have only two specimens and cannot now destroy either.)

The first and larger species is *Tripudia quadrifera*, the *Erastria quadrifera* of Zeller from Mazatlan, Mexico, represented by a single fresh specimen from Texas, received by me from Mr. Meske. This species is totally dark with a velvety patch on median space. On the hind wings both species beneath are distinctly marked.

Tripudia flavofasciata, n. s.

Very small, with a broad yellow band filling up the sub-basal space obliquely on primaries. Base of the wing blackish. Beyond the yellow band the wing is blackish with scattered pale or shining points, the ornamentation difficult to trace. The subterminal line is indicated very near the margin by pale festoons. Hind wings totally blackish as in *quadrifera*. Beneath the fore wings are blackish, with pale discolorous internal margin as in *quadrifera*, The hind wings show a discal spot ringed with pale and a pale subterminal line very near the margin. *Expanse* 7 mil. Demopolis, Alabama, collected by myself in the day time hovering over flowers, in the month of June.

In the ornamentation of *quadrifera* Prof. Zeller sees a resemblance to *Plusia*. Both species must be added to the "List of North American Noctuidæ."

Glaea carnosa.

The male of this species has the antennæ pectinate. A specimen has been sent me by Mr. Roland Thaxter, taken on Long Island. It will thus fall into a distinct section of the genus. We must also separate from the other species *tremula* and *pastillicans* (perhaps too closely allied to be distinct species) on account of the dorsal thoracic ridge of hair. According to a determination by Mr. Morrison, *venustula* is a synonym of *sericea*. I am still at a loss, however, to account for the statement that the claviform spot is marked in white. None of my specimens in this genus show any trace of the claviform spot.

Antaplaga, n. g.

Belongs to the series of Noctuid genera related to *Schinia* Hübn. The palpi are short; tongue moderate; antennæ simple. Legs slender; fore tibiæ with a long and rather large, pointed claw. Vestiture of the body and appendages consisting of flattened scales. Front with a naked protuberance, arising from a narrow rim which is exposed inferiorly; the

protuberance rises above, absorbing the rim, and its surface is irregularly roughened. The structure differs from *Fala*, in which a wedge-shaped protuberance arises from a cup: or from *Plagiomimicus*, which has the cup empty. The scaly vestiture and the shape of the wings are distinctive. These latter remind one of *Pippona*. The costal margin of primaries is long, external margin very oblique, apices produced, internal margin comparatively short.

Antaplaga dimidiata, n. s.

Head, thorax and basal third of fore wings white. Beyond, the wing is blackish brown, limited obliquely and a little unevenly from the white basal portion by the difference in color. A whitish subterminal shade. A discal mark obscurely indicated on the darker portion of the wing. Hind wings pale fuscous with white fringe: beneath whitish. Fore wings beneath fuscous. *Expanse* 30 mil. *Hab.* Colorado, Prof. Snow.

TINEINA FROM TEXAS.

(Continued from February No.)

BY V. T. CHAMBERS, COVINGTON, KY.

BLASTOBASIS.

My knowledge of this genus is derived wholly from Prof. Zeller's paper. It is equal in part at least to *Holcocera* Clem. (I have to thank Prof. Riley for calling my attention to the fact that in some of my references to this genus the name is incorrectly given as *Holocera*.)

B. sciaphilella Zell., as described and figured, differs from *H. triangularella* Cham. as to the position, size and form of the triangular spots on the wings. *Sciaphilella* has distinct opposite, comparatively small costal and dorsal triangles, while *triangularella* has no dorsal triangle, but a single large costal one, wide upon the costa and crossing the fold, and it also has the apical part of the wing distinctly streaked and clouded with brownish gray. They do not seem to differ otherwise.

In a former paper I have referred to *H. glandulella* Riley some other Texas specimens differing slightly from typical bred specimens of *glandulella* and from Prof. Riley's description. The form described by Prof. Zeller as *B. nubilella* is one of these, and is, I think, only a variety of *glandulella*. Prof. Riley concurs with me in this, and he thinks *triangulatella* and *sciaphilella* are also varieties of it. I am strongly inclined to concur with him. I have made some remarks on this subject in the former paper.

Argyresthia austerella Zell.

A. undulatella Cham.

I have never met with a specimen quite so strongly marked as that figured by Prof. Zeller, but I have elsewhere *(ante v. 6, p. 10)* remarked on the amount of variation in the intensity of the markings of the species. I have known it many years, and while I write (June 3rd, 1876) it swarms in hundreds around elm trees in this region. It is not improbable that the dark markings are deeper in more southern localities. Other species of *Argyresthia* have the habit of undulating or "see-sawing," but none that I have seen practice it to such an extent as this. Prof. Zeller first described it.

Aetole bella Cham.

Before I saw Prof. Zeller's description of *Heliozella gracilis*, I thought it not improbable that it would prove to be this species, because of the resemblance in structure of the head and its appendages in the two genera and the fact that both were taken in the same locality, where *A. bella* seems to be not uncommon. They are, however, quite different creatures. *Aetole* perhaps approaches *Helissines* as nearly as it does *Heliozella*. I have, however, no acquaintance with either genus other than through written accounts of them, having never seen a species of either. *A. bella* resembles *Chrysoclista lineella* in ornamentation more than it does any other species known to me.

COLEOPHORA.

C. bistrigella.

With fresher specimens before me, I amend the description of this species. Snowy white, in some lights silvery. The fore wings have two rather pale ochreous-yellow streaks from the base, one of which is above

the fold and goes to the tip, its basal half being margined above by a line of brown scales, and its apical part margined similarly towards the fold. The other streak is just within the dorsal margin, and goes to the dorsal ciliæ. *Al. ex.* a little over ½ inch.

LAVERNA.

L. œnotherœella Cham.

This is evidently the species which had been previously described as *Phyllocnistis magnatella* by Prof. Zeller. "*Bistrage*, &c., 1873," and I confess to feeling some surprise on finding it referred to *Phyllocnistis*, though after reflection I find the mistake in locating it there not so great as it at first appeared to be. Still I think it is more properly placed for the present in *Laverna* than in *Phyllocnistis*. I placed it with some hesitation in *Laverna*, and admit that it is not a true *Laverna*, and I think a new genus will ultimately be erected for it. Indeed, I at first prepared the diagnosis of such a genus, but finally considering the somewhat heterogenous character of the genus *Laverna*, I ultimately concluded not to separate it from that genus at present. It may be that I attribute too much importance to neuration as affording generic characters; nevertheless, I think it probable that in the scarcity of specimens Prof. Zeller did not examine the neuration of this species, or he would not have referred it to *Phyllocnistis*, and I feel still more confident that he would not have so done had he known the larva and its habits; while, on the other hand, I perhaps should not have been surprised to see it referred to *Phyllocnistis* had I not known its neuration, and its larva and larval habits as given by Miss Murtfeldt in CAN. ENT., v. 7, p. 31. Like Prof. Zeller, I was struck by its resemblance in ornamentation to *Lyonetia*, so that my MSS. specific name, before I knew its larval habits, was *lyonetiella*.

My reasons for venturing to differ from Prof. Zeller as to its generic affinities are as follows: 1st—Considering the minute size of all other known species of *Phyllocnistis*, and their close resemblance in ornamentation, the much greater size (nearly three times the *alar ex.* and nearly four times the weight) of this species and the difference in ornamentation (which, however, bears some resemblance to that of a *Phyllocnistis*), I should have suspected structural differences as great as those of size. 2nd—The characters drawn from the head and its appendages, while very nearly those of *Phyllocnistis*, do not differ in any important particular from those of some species of *Laverna* and of some other genera allied thereto;

greater differences, for instance, exist between the palpi of *L. langiella* and *L. lactiella* than are found between the latter and *magnatella* Zell. 3rd—The neuration of the wings places the species among *Elachistidæ* and not in *Lyonetidæ*. The neuration of the fore wings is exactly that of *Laverna Stainloni*, as figured *Ins. Brit.*, *v.* 3, except that in this species the apical branch of the median vein goes to the apex instead of to the dorsal margin before it. As in *Laverna*, the submedian is furcate at the base, which is not the case with *Phyllocnistis*; and though, owing to the peculiar ornamentation of the apex, the fore wings appear to be decidedly caudate, yet when denuded, they are found to be scarcely more so than in *Laverna atra* as figured *loc. cit.* The form of the hind wings is very nearly that of *L. epilobiella*, figured *loc. cit.*; and the neuration is identical with it except that the superior branch of the subcostal goes to the apex instead of to the costal margin just before it, and *the cell is indistinctly closed.* The fold and the dorsal vein are both distinct. In all these particulars it differs greatly from *Phyllocnistis* and agrees with several well recognized species of *Laverna* as well as, if not better, than they do with each other. 4th—The larval habits, as described by Miss Murtfeldt, CAN. ENT., 7, p. 31, are those of several species of *Laverna*, but of no known species of *Phyllocnistis*, and the larva, while not closely resembling any *Laverna* larva known to me, is still more unlike that of *Phyllocnistis*, in fact, totally distinct from it, having sixteen feet. For these reasons I think its affinities are with *Laverna* and not with *Phyllocnistis*. The specific name *magnatella* Zell. has priority over *œnotherœella*. *Magnatella* is very appropriate if the species belongs in *Phyllocnistis*, but not if it is a *Laverna*. I have never seen *L. eloisella* Clem., but I suspect that it will be found congeneric with this species.

I find that in the description of the species I have inadvertently omitted to mention the large tuft of raised scales margined behind with brown, and the short, longitudinal, black line behind it, situated within the margin at the base of the dorsal ciliæ, between the "two streaks which diverge from the small tuft within the dorsal margin before the ciliæ." See v. 7, p. 31.

L. unicristatella Chamb. previously described by Zeller as *L. definitella*.

DESCRIPTION OF A NEW LIMACODES.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Limacodes latomia, n. s.

This species is similarly sized with *y-inversa*, or perhaps a little larger. It is less brightly colored. The fore wings are dusky ochre with two blackish lines : the first crossing the wing a little obliquely at the middle ; the second before the apex from costa to external margin. The lines do not meet at costa as in its ally. The space between the lines is *discolorous*, being somewhat grayish. Hind wings more yellowish, concolorous. Beneath immaculate, like hind wings above. Thorax like fore wings. Antennæ simple. Several specimens taken by Belfrage in Bosque Co., Texas ; No. 572, May.

NOTES ON SOME SPECIES OF MELOE OCCURRING IN TEMPERATE NORTH-EASTERN AMERICA.

BY F. B. CAULFEILD, MONTREAL, P. Q.

The life history of *Meloe*, as given by the Editor in the December No. of this journal, agreeing very closely with that of *M. angusticollis* Say, as far as my knowledge of its habits will permit me to judge, it occurred to me on reading Mr. Brodie's very interesting notes in the January No., that unless we have in this country a double brooded *Meloe*, some one must be referring another species to Say's *angusticollis*.

We have in temperate North-eastern America several species of *Meloe* closely resembling each other in general appearance, two of which are widely distributed, sometimes, probably often, occuring in the same localities, but I think at different seasons ; the first, *M. angusticollis* Say, appearing early in May and disappearing before or about the middle of June ; the other, *M. americanus* Leach, appearing in the latter end of July or beginning of August, and lasting until after the early frosts.

Having compared specimens of what I believed to be *angusticollis* with Say's description, I felt satisfied that I had that species, but I took *americanus* Leach to be *rugipennis* Lec., from having compared it with

specimens of *americanus* labeled *rugipennis*, in the collection of the Montreal Natural History Society, and from records of the capture of *rugipennis* in other localities at dates corresponding with the time of appearance of *americanus* here. However, as our *Meloes* resemble each other very closely, and as the description of *rugipennis* did not seem to suit the specimens labeled as that species, I did not feel justified in trusting to my own judgment in the matter, and sent a specimen of each species to Dr. LeConte, with the request that he would determine them for me. Having examined them, Dr. LeConte informed me that my determination of *angusticollis* was correct, and with his consent, I give the following corrected synonymy, which he very kindly sent to me :

" 1. M. ANGUSTICOLLIS Say = *rugipennis* Lec.—Punctures of head and prothorax coarse and deep. This has been considered by some author, as = VIOLACEOUS Marsham. of Europe, but I have not compared them ; one specimen in my collection was thus labeled.

" 2. M. AMERICANUS Leach—*angusticollis* Lec. Punctures very fine and prothorax still narrower."

As Say's description of *angusticollis* is very good, I give it for the benefit of those who may not have access to the work in which it is given, viz., Jour. Acad. Nat. Sci., Phil., 3, 280 :

" *Meloe angusticollis*. Thorax narrower than the head, elytra and abdomen violaceous. Inhabits Pennsylvania. Body dark violaceous, punctured ; head with profound punctures, an impressed, longitudinal, abbreviated, acute frontal line, and a transverse, elevated, obtuse one connecting the bases of the antennæ. Thorax slender, narrower than the head, profoundly punctured, widest rather before the middle, and narrowed at tip and base ; base emarginate and slightly margined. Elytra rugulose dark bluish-violaceous. Feet slightly hairy ; spines of the tibia and nails ferruginous. Abdomen slightly rugulose, dark greenish or violaceous ; tergum, each side black, opaque."

M. americanus Leach is a smoother and more delicate looking insect than *angusticollis*, and the blue is inclined to shade into green in certain lights, especially on the head and thorax ; the punctures are so fine as to be almost invisible to the naked eye (in *angusticollis* the coarseness of the punctures give it a slightly roughened appearance). The acute, impressed frontal line, so characteristic of *angusticollis*, is wanting in *americanus*, and altogether it is a softer and more oily-looking insect.

M. angusticollis Say, makes its appearance here in the beginning of May, very soon after the snow has melted. I first observed it in 1872 ; I cannot now give the exact date, but it was early in May. I found three specimens on Montreal Mountain, one male and two females. Referring to my notes, I find the following dates for them in 1874 : May 2nd, one specimen, Hochalaga, Montreal ; May 13th, one specimen, Montreal Mountain ; May 20th, eight specimens, Hochalaga, Montreal.

I did not observe them in 1875. On June 10th, 1876, the Montreal Natural History Society held their annual field day at St. Hillair, between twenty and thirty miles south of Montreal, and I was given a specimen of *Meloe* taken there on that day : unfortunately I did not preserve it, and cannot now be certain what species it was, but at the time I did not think it different from those I found in May, and as it was a female with the abdomen very large, I think it probable that it was the same.

I did not study their habits closely, as my spare time was chiefly devoted to Lepidoptera, but I only noticed them on warm, sunny days ; I did not find any under stones, but I think it not unlikely that they may seek shelter under stones during wet or cold weather, as I have sometimes found to be the case with *Cicindela sexguttata.*

Mr. J. M. Jones, of Halifax, N. S., in a communication dated June 4th, 1871, CAN. ENT., vol. 3, p. 37, says : "*Meloe angusticollis* very abundant on Halifax common about the middle of May, now totally disappeared."

Mr. A. S. Ritchie, in his "List of Coleoptera taken on the Island of Montreal," records *M. angusticollis* Say, date of appearance not given : Coleoptera determined by Dr. Horn. This, I think, would be *M. americanus* Leach. In the same list Mr. Ritchie records *M. rugipennis* Lec. This, I think, would be *M. angusticollis* Say.

Mr. J. Pettit, in his "List of Coleoptera taken at Grimsby, Ont.," CAN. ENT., vol. 2, p. 132, records *M. angusticollis* Say. This is probably *M. americanus* Leach.

Mr. Wm. Couper, in his "List of Coleoptera taken at Quebec and other parts of Lower Canada," published at Quebec in 1864, records *M. angusticollis* Say as "common on potato-vines," no date given. As most of Mr. Couper's Coleoptera were named by Dr. LeConte, this also is probably *M. americanus* Leach.

I have no record of the capture of *M. americanus* Leach, myself, but

if I remember rightly, I took a *Meloe* rather late in the season, on Montreal Mountain, last summer. I thought at the time it was a soft, rich looking specimen, but I did not take a note of it. On reading Mr. Brodie's paper, I examined my specimens of *Meloe* carefully, and found a specimen of *M. americanus* Leach in a box of duplicate Coleoptera taken on the Island of Montreal, but at the time I did not know what it was. Having compared it with specimens labeled *rugipennis*, in the Montreal Natural History Society's collection, I found it to be the same; this specimen I afterwards sent to Dr. LeConte, who gave me the correct determination.

Mr. P. Kuetzing has kindly given me a pair of this species, taken by him in the latter end of July of last season (1876), in this neighborhood. This is the earliest record of the appearance of *americanus* known to me, but as Mr. Kuetzing only found the pair, and as the abdomen of the female is quite small, we may, I think, reasonably infer that they had just emerged, and were the pioneers of the August brood.

Mr. G. B. Pearson informs me that he has seen a species of *Meloe* common here during the latter part of summer, and noticed them late in October; doubtless the same species.

Mr. H. H. Lyman kindly lent me three specimens of *Meloe* for examination. One is *M. angusticollis* Say; the others are *M. americanus* Leach. Mr. Lyman informs me that the specimens of *americanus* were taken at Portland, Me., in August, 1873, but cannot tell when or where the other was taken. He says, however, that if it is *angusticollis*, it was probably taken at Montreal, as he never went down to Portland before the middle of July.

In a "List of Coleoptera found in the vicinity of Montreal," by W. S. M. D'Urban, Canadian Naturalist, vol. 4, p. 307, he records *rugipennis* Lec. as common. Mr. D'Urban states that nearly all the species were determined by Dr. LeConte.

In a "List of Coleoptera collected in the Valley of the River Rouge and neighboring Townships," by W. S. M. D'Urban, Geological Survey of Canada, report of progress for 1858, p. 226, he records *M. rugipennis* Lec., Hamilton's Farm, 31st August, and Grenville, 14th October.

In a List of Coleoptera collected on the south-east side of the St. Lawrence, from Quebec to Gaspé, and in the Counties of Rimouski, Gaspé and Bonaventure, by Mr. Robert Bell, jr., same report, p. 247, he records

M. rugipennis Lec. "between Metis and the mouth of the Matapedia." The date is not given, but as he records *Colias philodice* "between Metis and Lake Matapedia, August 17th," and as he did not arrive at Great Metis until August 14th, it must have been taken in that month or later. M. D'Urban, who drew up this list, states that Mr. Bell's Coleoptera were determined by Dr. LeConte.

I frankly confess that the records of Messrs. D'Urban and Bell puzzle me, for if the dates given by these gentlemen are correct, and if the specimens taken by them were determined by Dr. LeConte as *rugipennis* Lec., which is *angusticollis* Say, then that species must, I think, be double brooded. I believe, however, that if Dr. LeConte had seen specimens taken at those dates, he would have determined them as *M. angusticollis* Say, which would prove them to have been *americanus* Leach, when the dates would correspond with its time of appearance here, at Portland, and I believe, elsewhere. I am strengthened in this belief by the fact that specimens of *americanus* in the collection of the Montreal Natural History Society are labeled *rugipennis*, a mistake that Dr. LeConte would never have made.

I think Mr. Brodie's notes also point to the conclusion that *americanus* is the species found in autumn; this gentleman could give us important evidence in this matter by carefully comparing his specimens with Say's description, and letting us know which species they belong to. I do not think that any of our *Meloes* are double brooded, but if Mr. Brodie's specimens are the true *angusticollis* of Say, it would seem as if such must be the case, as it seems improbable that a species would be taken in some places in spring, and in others in autumn, if it was not double brooded.

Dr. Packard, speaking of the larvæ of *Meloe* found by him in spring, says: "It is undoubtedly the young of our common *M. angusticollis* Say." If we substitute the name *americanus* Leach for *angusticollis* Say, this statement will, I think, be perfectly correct, unless the larvæ observed by Dr. Packard belong to one of our other species (I only know *angusticollis* and *americanus*).

M. angusticollis probably oviposits during the end of May and beginning of June, and by the end of June and during July we might, I think, expect to find the larva. These are, however, points that require careful investigation, as nothing short of rearing the perfect insect will enable us to identify the larva.

I will during the coming season, as far as my time will permit, endeavor to ascertain the dates of appearance, duration, &c., of these species in this locality, and I trust that Entomologists in other parts will do the same, so that the life history of our North American species may be worked up.

IMPORTANT NOTICE.

In consequence of the pressure of other engagements, our Secretary-Treasurer, Mr. J. H. McMechan, has found it necessary to resign his office. Until further notice, our correspondents will please address *all* communications to the Editor.

BOOK NOTICES.

Packard's Half Hours with Insects, Boston, published by Estes & Lauriat, 1877, 12 mo., pp. 384, illustrated, $2.50, which was originally issued in twelve numbers, has lately been published in book form. We desire to correct some typographical and other errors of importance. Page 187, in explanation of Fig. 187, for Bucculating read Bucculatrix; page 289, line 23, for *Disippus* read *Archippus*, and in line 25, for *Archippus* read *Disippus;* page 305, line 13, for sumac read cottonwood, and on page 306, in explanation of Fig. 236, for sumac gall read vagabond gall.

We cheerfully commend this useful work to our readers.

Report upon the Orthoptera collected by the Wheeler Expedition, by Samuel H. Scudder; 8vo., 17 p. In this paper the author gives much valuable information in relation to the Orthoptera occurring on the eastern slope of the Rocky Mountains; 17 new species are described, and definitions of 8 new genera given. Report of the Hayden Expedition, from the Department of the Interior, containing Brief Synopsis of North American Ear-wigs, with an appendix of the fossil species; 8vo., 12 p. List of Orthoptera collected by Dr. A. S. Packard in Colorado, &c., during 1875; 8vo., 7 p. Notice of a small collection of Butterflies made by Dr. Packard in Colorado and Utah. All by Samuel H. Scudder. We tender our best thanks to the author for copies of these papers.

The Canadian Entomologist.

VOL. IX. LONDON, ONT., MAY, 1877. No. 5

THE UNITED STATES ENTOMOLOGICAL COMMISSION.

The enormous losses occurring yearly to agriculture in America from destructive insects are gradually awakening public attention in this direction, and also to the necessity of careful observations on the habits of these pests, with a view to their destruction or limitation. We were much gratified to learn that the late Congress of the United States, recognizing the importance of this subject, made a liberal appropriation to provide for the appointment of a commission of practical Entomologists to investigate and study the habits and life history of these insect pests, and thoroughly test such measures as have been or may be suggested with the view of lessening their ravages, the investigations to be carried on for several consecutive years. The Government has been particularly fortunate in securing the services of three eminently practical Entomologists to undertake this work, Prof. Riley, State Entomologist of Missouri, Dr. A. S. Packard, of Salem, Mass., and Prof. C. Thomas, State Entomologist of Illinois: Prof. Riley has been designated chief, Dr Packard secretary, and Prof. Thomas disbursing agent. While the destructive Rocky Mountain Locust, *Caloptenus spretus*, will specially engage the attention of the Commission during this year, careful observations will at the same time be made on other destructive pests. We desire to call particular attention to Dr. Packard's request in this present issue for specimens in all stages of the Hessian Fly, Joint Worm and Wheat Midge, and trust that all our members will endeavor to aid the Commission in their labors in every possible way.

The head-quarters of the Commission will be at St. Louis, Mo.: there will also be an office, with a clerk to attend to certain routine business, at the rooms of the Geological and Geographical Survey of the Territories, at Washington, D. C., Dr. F. V. Hayden in charge.

The locust area assigned to each Commissioner the present year is as follows :—

1. Prof. Riley takes for his field the region east of the mountains and south of the 40th parallel, the west half of Iowa, and, conjointly with Dr. Packard, British America west of the 94th meridian, where the principal source of the devastating swarms will probably be found.

2. Dr. Packard will take for his field West Wyoming, Montana, Utah, Idaho, and the Pacific Coast.

3. Prof. Thomas takes all the region east of the mountains not enumerated, including Nebraska, Minnesota, etc.

The publications will consist of circulars, bulletins, memoirs, and the annual report of doings and results of the work of the Commission.

To Prof. Riley are assigned more particularly the following divisions of the subject: Biology, or Natural History; Insect Enemies and Parasites; Remedies and Devices for Destruction.

To Dr. Packard: Anatomy and Embryology.

To Dr. Packard and Prof. Thomas, conjointly: Meteorological Bearings and Migrations.

To Prof. Thomas: Geographical Distribution, Enemies not Entomological, Agricultural Bearings of the Subject.

The Commission expects to secure co-operation with the United States Signal Bureau in affording meteorological data in connection with a study of the migrations of the locust; also, hopes to secure the aid of the Canadian Government in co-operating with it in its investigations in British America.

It is the determination of the Commission to confine its operations more particularly to the practical bearings of the subject, with a view to ascertain all possible remedies against these destructive insects. All else will be made subservient to the great object for which the appropriation was made, to wit :—

1. The best means of fighting the plague as it occurs in the States to which it migrates, but in which it is not indigenous.

2. The thorough investigation into its habits in its native home, with a view of preventing, if possible, its migrations therefrom.

The following are the topics on which data are requested from observers in all parts in reference to the destructive locust :—

1. Date, and time of day of the arrival of swarms.
   - 1*a*. Direction and force of the wind at the time.
   - 1*b*. Temperature and character of the weather at the time (clear or cloudy).
   - 1*c*. Direction of the flight, density, height and extent of the swarms.
2. Date and time of day of the departure of swarms.
   - 2*a*. Direction and force of the wind at the time.
   - 2*b*. Temperature and character of the weather at the time.
   - 2*c*. Direction of the flight, density and extent of the swarms.
3. Date when the first eggs, if any, were deposited the present year.
4. Date when the eggs were most numerously hatching the present year.
5. Date when the eggs were most numerously hatching in previous years.
6. Proportion of eggs that failed to hatch the present year, and probable causes of such failure.
7. Nature of the soil and situations in which the eggs were most largely deposited.
8. Nature of the soil and situations in which the young were most numerously hatched.
9. Date at which the first insect acquired full wings.
10. Date when the winged insects first began to migrate.
11. Estimate the injury done in your County and State.
12. Crops which suffered most.
13. Crops most easily protected.
14. Crops which suffered least.
15. The prevailing direction in which the young insects travelled, and any other facts in relation to the marching of the young.
16. The means employed in your section for the destruction of the unfledged insects, or to protect crops from their ravages, and how far these have proved satisfactory.
17. The means employed in your section for the destruction of the winged insects, or to protect crops from their ravages, and how far these have proved satisfactory.

18. Descriptions, and if possible, figures of such mechanical contrivances as have proved useful in your locality for the destruction of either the young or the winged insects.

19. If your section was not visited in 1876, please state this fact.

20. If visited any previous year, please give the dates.

21. To what extent have birds, domestic fowls, and other animals, domestic or wild, been useful in destroying these insects?

As the successful prosecution of this work is as deeply important to the western portions of our Dominion (where immense damage is often inflicted by this destructive foe) as to any part of the United States, it is hoped that our Government will render all possible aid to the work of this Commission, either by instructions to parties engaged in surveys and other Government work in the western regions, to make the necessary observations, or otherwise by appointing suitable co-operating agencies to aid in the work.

NOTES AND DESCRIPTIONS OF NEW MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Every student knows how much depends on the careful handling and perfect condition of specimens of moths for the cabinet. Especially in the *Noctuæ*, where the scale tufts on the body are used for generic characters, is it necessary to have well preserved material in order to give a definite determination. In this respect the collections of Prof. Lintner, Mr. Hill, Dr. Bailey and (though last by no means least) Mr. Otto Von Meske are to be very highly praised. The students of Albany have shown themselves excellent collectors, and it is a great pleasure to examine their specimens. I do not say that Mr. Von Meske's collection is the best in the country in this respect, but I do say that it is the best I have yet seen. Sugaring for *Noctuæ* in April and May has been found very remunerative in the vicinity of Albany. Beautiful specimens of *Lithophane pexata*, *fagina*, *Bethunei*, *disposita*, *lepida* and *Thaxteri* have been taken in

this way. Dr. Bailey has captured in this manner *Scopelosoma devia*, *Graefiana*, and *tristigmata*; also *Morrisonia vomerina* and *evicta*. Species of the genus *Homoptera* have also occurred not unfrequently; among these I may mention *multinotata*, a species easily recognized by its strongly dentate pale brown wings, the exterior line deep brown on primaries, blackish on secondaries. It is to be hoped that this method of capturing moths will be more extensively used; it will infallibly reveal unexpected varieties in every neighborhood.

Dasychira Lintneri, n. s.

♂. Dark gray, shaded with ochrey at the base of primaries, on the median space and along subterminal line. Basal line dark, narrow, dentate on costa, slightly outwardly projected below median vein. Extra basal space wide. Interior line very distinct, perpendicular, black, toothed on subcostal vein, thence inwardly excavate to median vein at the point of origin of vein 2, thence again excavate to vein 1, diffuse on the margin. Exterior line faint, with whitish included shade. Subterminal line irregular. Fringes blackish, white externally and interrupted with white. Hind wings gray with a mesial shade line followed by whitish and shaded with blackish on external margin at anal angle, where the commencement of a second outer line is indicated; fringe as on fore wings. Body stone gray; antennæ with lengthy pectinations. Beneath the wings are paler; hind wings whitish with a sinuate blackish mesial common line. Body paler beneath. Expanse 40 mil. Centre, N. Y., in May, several specimens in the collections of the State Museum, Mr. Hill and Dr. Bailey.

Euchaetes Spraguei Grote.

The female of this fine species is contained in Mr. Von Meske's collection from Texas. The stripes on costa and internal margin are paler than in the male.

Euclea incisa Harvey.

The female is in Mr. Meske's collection from Texas. The hind wings are paler, more yellowish than in *paenulata*, there is no red stain at the angulation of the green space near internal margin on primaries, the angulation is not so deep and the terminal brown space is narrower. I regard the two as different species. Both forms are in the collection of the Buffalo Society of Natural Sciences and of Mr. Von Meske.

Lithophane Baileyi, n. s.

♂ ♀. Greenish gray and resembling at first sight *querquera* from its color, but with the usual markings of the genus distinct, and with narrower wings. Fore wings rather dark greenish gray. Basal dash black, surmounted by the usual pale shade. T. a. line double. Orbicular concolorous. Reniform large, rounded, with a remarkably bright red stain and shaded with blackish. Median shade blackish, diffuse between the spots T. p. line double, denticulate, a little more outwardly exserted than in *querquera*, opposite the cell. Subterminal line more or less evident by its fuscous preceding shade. Terminal line black, sub-continuous. Hind wings fuscous with dark fringes. Beneath fuscous with a ruddy hue, a common line and discal spots. Expanse 36 mil. Two specimens taken near Albany in September, by Mr. Geo. J. Bailey, for whom the species is named. One male also from Canada.

This species differs from *querquera* by the narrower wings, with the costal angulation more pronounced, the more grayish color, the scalloped terminal line, less deeply waved subterminal, and the distinct median lines ; the secondaries and their fringes are not reddish above.

Apatela (Acronycta) falcula, n. s.

♀. Allied to *tritona* and *grisea*. The external margin is sinuate, not straight, sweeping inwardly below the apices and bulging opposite the median nervules. Fore wings dark purple gray, very like *tritona*. A black basal dash lined above with pale, furcate. Internal margin at base with a patch of light brown scales. Ordinary spots concolorous, faintly outlined, orbicular larger than in *tritona*. Median shade obsolete ; median space very wide. T. a. line evident above the basal dash (which slightly exceeds the line) and here blackish ; beneath the dash obsolete. T. p. line shaped as in *tritona*, but without the discal incision, blackish, sub-dentate, edged outwardly with brown, inwardly with whitish. Black dash on submedian fold not extending within the line. Hind wings whitish at base, outwardly vaguely and largely blackish. Fore wings beneath fuscous ; hind wings whitish with a faint discal spot and external sinuate macular band. Thorax like fore wings, edged on the sides and behind with light brown. Body beneath whitish ; abdomen above light gray. Expanse 35 mil. Illinois, Mr. Thos. E. Bean.

This form differs from its allies in the shape of the external margin of

primaries, the bright brown edging to the thorax, and in the details of the ornamentation throughout.

Mamestra Beanii, *n. s.*

♂. Allied to *purpurissata* in color, but not quite so large, about the size of *grandis*. Body tufts improminent. Eyes hairy. Antennæ with a white dot at base, simple, ciliate; in *purpurissata* they are serrate and bristled. Purple gray brown, darker than *purpurissata*, median space tinged with reddish. Ornamentation not distinct. Ordinary lines double, lunulate or waved; t. a. line with its outer line more distinct and blackish. Claviform small, black-edged. Orbicular large, paler than the wing. Reniform rather narrow, with an internal shaded ring, stained with ochrey red. T. p. line not much indented below the median vein. Subterminal line continuous, nearly even, with a notch on the interspace between veins 3 and 4, indicating the usual W-mark. Apices with a whitish shade. Fringes concolorous. Hind wings dark fuscous with whitish fringe. Beneath paler, fuscous, with the costal and terminal spaces powdered with gray, reddish or purplish. Double exterior common shade lines and faint discal dots. Expanse 45 mil.

I name this fine species for its discoverer, who has collected some rare moths with the present species at Galena, Illinois. Mr. Bean has taken there *Calymnia calami* Harvey, previously only known from Texas; also *Lithophane semiusta*, *Scopelosoma tristigmata*, *devia* and *Pettiti*.

Gortyna rigida Grote.

♂ ♀. I have alluded to this species in the Proceedings of the Ent. Soc. of Phil., 4, 324, as being allied to *cataphracta*, and differing chiefly in the straight transverse posterior line, much as *purpurifascia* differs from *rutila*. It is paler yellow than *cataphracta*, with less purple and dark shades. The stigmata are concolorous. The base of primaries is pale; there is a faint terminal purplish washing in the male. My female specimen does not show but very faint traces of it. The moth is a little slighter than its ally, and can be quickly known by the rigid purple t. p. line not bent opposite the disc as it is in *cataphracta*. ♂ Penn.; ♀ Illinois (Mr. Bean).

The following species is the first Eastern representative of the genus *Ochria*, which contains the European *flavago* and the Californian *sauzalitæ*.

Ochria Buffalocnsis, n. s.

♀. The clypeus has a frontal horn, else the insect looks like *Gortyna rutila* and allies. The primaries are brownish red with the extra-basal and subterminal spaces washed with purple. T. a. line geminate, waved, with rather a deep sinus on vein 1, its inner line purple, its outer dark brown red. Orbicular spherical, yellow white. The accessory spots are totally wanting; this last superficial character will separate the moth from any N. Am. species of *Gortyna* allied to *rutila*, known to me or described by Guenée. Reniform moderate, yellowish, interlaced with a double brown curved line. T. p. line double, nearly straight, not exserted opposite the cell, but prolonged on costa as in *purpurifascia;* its outer line is dark purplish, more diffuse. S. t. line dark, distinct, irregularly dentate. External margin even, bulging opposite median nervules. Veins obscurely purplish. Hind wings pale red, with a mesial straight dark line. Beneath light purple red, with a distinct common line; on hind wings a narrow lunule. Body beneath concolorous with wings; thorax above darker, more purplish. Expanse 40 mil. Miss Mary Walker, Buffalo.

Polia pallifera, n. s.

♀. This species resembles Herrich-Schaeffer's figures of *platinea.* Fore wings whitish gray with the median space washed with olivaceous beyond the olive median shade line. Claviform olivaceous, very large, finely lined with black. Reniform and orbicular gray, shaded with olive, the former white narrowly margined with black. Median lines geminate, of the usual shape. Beyond the t. p. line the wing is whitish gray, cut by the olivaceous shaded s. t. line. Fringes obscure with an interrupted dark line. Hind wings fuscous, paler at base with a sinuate mesial line and a pale subterminal shade. Beneath dirty whitish with double lines and discal marks. Body beneath and abdomen obscure whitish or dusty gray; thorax more purely gray. Expanse 42 mil. Illinois, Mr. Bean.

I cannot identify this with any of Mr. Morrison's descriptions under this genus. It has the fascies of European species of the group. It recalls the Californian *Dian. insolens*, but the eyes are naked.

Homoptera Woodii, n. s.

♂. This species is more strigate than any other known to me. Collar brown with a black mesial line, tipped with gray. Wings dentate, covered with dark strigae. Base of primaries blackish, defined by a broad velvety

black bent interior line. Orbicular wanting. Median space pale anteriorly, blackish posteriorly, where this last color includes the narrow pale reniform with its distinct central black streak, and extends beyond the line narrowly and over costal region to apices. T. p. line fine, black, even, undulate, bent inwards opposite the cell in the centre of its superior exserted portion. Subterminal line defined by the margin of the blackish mesial shading, excavate opposite the cell and more widely so inferiorly. Terminal space pale like the anterior half of median, showing the strigae very plainly. Hind wings pale fuscous, covered with dark strigae, with a more or less determinate mesial line, beyond which the wing is paler. Beneath pale fuscous, strigose: the discal mark indicated on primaries, as also a common mesial line. Expanse 38–40 mil. Several specimens taken at Centre, N. Y., by Dr. J. S. Bailey, and his assistant, Mr. W. C. Wood, of Wayne Co., N. Y., for whom the species is named.

The Albany collectors are studying this difficult genus, and Mr. Hill has called my attention to the fact that *vinosa* and *lunata* are possibly sexes of one species.

I am indebted to Mr. Bean for an Illinois specimen of *Homoptera penna* Morrison.

Endropia homuraria G. & R., Tr. Am. Ent. Soc., ii., 80.

Dr. Packard gives this as a synonym of *duaria*, but erroneously. A comparison of our description shows that it applies to a form with "the angles of the external margins of the wings more determinate" than *hypochraria*. Now *duaria* has the external margins rounded. *E. homuraria* is more intensely colored than its allies: beneath it is "intense deep orange, the common line followed externally by a bright purplish shade." The species is well described and cannot be mistaken for *duaria*. It is very near to *hypochraria;* the median lines are angulated as in that species. The discal sinus of the exterior line on the wings above seems to be shallower in *homuraria*, of which I have seen no female specimens as yet.

Lozogramma lactispargaria.

Cidaria lactispargaria Walk., Can. & Geol., 6, 41.

Tephrosia disconventa Walk., C. B. M., 21, 404.

Lozogramma disconventa Pack., 243, pl. 9, fig. 56. Albany (Lintner); Quebec (Belanger).

These different names refer to the same species. The wings are scalloped, not entire, and I accept Dr. Packard's generic determination with hesitation.

Tornos infumataria, n. s.

♀. Larger and stouter than *robiginosaria*, with the wings more elongate. Entirely smoky blackish. Fore wings with two sub parallel, oblique, irregular, black median lines, the exterior partly lined on the outside with whitish, but very faintly so. Hind wings with an indistinct mesial line, which is seen to be scalloped in the best marked specimens; beneath without markings. This concolorous species differs from its ally by the course of the waved median lines on primaries. Expanse 30 mil. June 3, 5; Texas (Belfrage, No. 604).

Aspilates pervaria var. *interminaria* Grote.

♂ ♀. Both sexes of this form, which is smaller than the type and differs at once by the absence of the lines on primaries, have been collected by Mr. Belfrage in Texas (male, June 5, No. 602; female, May 22, No. 653). It is paler than the type and looks like a different species.

LIST OF BOMBYCIDÆ OCCURRING ON THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFEILD AND C. W. PEARSON, MONTREAL, P. Q.

BOMBYCIDÆ.

Lithosiinæ.

Hypoprepia fucosa Hübn. Not common.
Euphanessa mendica Pack. Common; end of June, July.
Crocota Treatii Grote. Very rare; C. W. P.
" aurantiaca Hübn. Very rare; C. W. P.
" brevicornis Walk. Rare.
Utetheisa bella Linn. Rare.

Arctiinæ.

Callimorpha Lecontei Boisd. Common; end of June, July.

Platarctia parthenos Harris. Very rare : at light, 26th June, C. W. P.
Euprepia americana Harris. Not uncommon ; end of July, August.
Arctia virgo Harris. Rare.
Arctia Saundersii Grote. Not common ; July and August.
" nais Hübn. Very rare.
" virguncula Kirby. Very rare ; June, C. W. P.
Pyrrharctia isabella Abbott & Smith. Exceedingly common ; June, July.
Phragmatobia rubricosa Harris. Rare ; July, 1876 ; May 12th, 1877.
Leucarctia acrea Drury. Common ; June, July, August.
Spilosoma virginica Fabr. Very common ; June, July, August.
Hyphantria textor Harris. Common ; June, July.
Euchaetes egle Drury. Very rare : bred from larva found on Burdock. C. W. P.
" collaris Fitch. Not uncommon. June and beginning of July.
" Oregonensis Streck. Rare ; June.
Halesidota tessellaris Smith. Not common : July, frequents blossoms of *Asclepias cornuti* at twilight.
" caryae Harris. Common ; June.
" maculata Harris. Rare ; June.

Dasychirinæ.

Orgyia nova Fitch. Not common ; end of July, August.
" leucostigma Harris. Very common ; July and August.
Parorgyia parallela G. & R. Very rare ; Mr. Kuetzing.

Cochlidiinæ.

Euclea querceti Pack. Rare ; Mr. Lyman.
Limacodes y-inversa Pack. ? Rare ; Mr. Kuetzing.

Ptilodontinæ.

Datana ministra Drury. Not uncommon ; July.
" Angusii G. & R. Rare ; July, Mr. Hibbins.
Notodonta stragula Grote. Rare ; Mr. Hibbins.
Lophodonta ferruginea Pack. Rare ; C. W. P.
Pheosia rimosa Pack. Rare ; taken by Mr. Lyman.
Nerice bidentata Walk. Rare ; Mr. Kuetzing.
Edema albifrons Smith. Not uncommon ; June.
Œdemasia concinna Smith. Larvae, August ; rare.
Coelodasys unicornis Smith. Not common ; July.
" cinerofrons Pack. Rare ; Mr. Kuetzing.

Coelodasys biguttatus Pack. Rare; Mr. Kuetzing.
Heterocampa manteo Walk. Not common; June.
Cerura cinerea Walk. Rare; June, C. W. P.
" —— Undetermined. Not common; June.

Platypteryginæ.

Platypteryx arcuata Walk. Rare.
" lacertinaria Linn. Rare.

Attacinæ.

Telea polyphemus Linn. Very common, June, July.
Actias luna Linn. Not common; June.
Callosamia promethea Drury. Rare; June.
Samia cecropia Linn. Common; June.
" columbia Smith. Very rare; one specimen from cocoon found on maple, emerged in-doors May 15th, 1874; C. W. P.

Ceratocampinæ.

Hyperchiria io Fabr. Not common; June.

Dryocampinæ.

Dryocampa rubicunda Fabr. Very rare; Mr. Lyman.

Lacheiinæ.

Gastropacha americana Harris. Very rare; June 10th, C. W. P.
Tolype velleda Stoll. Not common; September.
" laricis Fitch. Very rare; Mr. Bowles.
Clisiocampa americana Harris. Very common; July.
" sylvatica Harris. Extremely abundant; July.

Hepialinæ.

Xyleutes robinae Harris. Not common; June.
Stenopis argentimaculata Harris. Very rare; July, F. B. C.
" thule Strecker. Very rare, F. B. C.

REMARKS ON THE SYNONYMY OF NORTH AMERICAN COLEOPTERA.

BY E. P. AUSTIN, CAMBRIDGE, MASS.

Tachinus fumipennis Say (Tachyporus) is not synonymous with *T. axillaris* Er., as supposed by Erichson, but differs from that species in several important particulars, as follows:

In *T. axillaris* the upper surface is extremely finely punctured, while

in *fumipennis* the elytra particularly have the punctuation much more distinct: but the sexual characters will enable the two species to be more readily separated. In *T. axillaris* the males have the fourth abdominal ventral segment triangularly impressed: the fifth is broadly impressed, with the apex deeply emarginate. In my specimen there is also a slight impression on the tip of the third segment, which is not mentioned in the description of Erichson. The sixth segment is terminated by two long, somewhat curved spines. The males of *T. fumipennis* have the third and fourth segments not impressed: the fifth is broadly impressed, with the apex only slightly emarginate and the terminal spines of the last segment are less prominent.

The female of *fumipennis* differs from that of *axillaris* as described by Erichson (I have seen no females of the latter species) by having the two external laciniæ of the last segment of the abdomen longer and more slender than the intermediate ones.

Tachinus colonus Sachse, from the Southern States, differs by the description from either of the above species, and will probably prove to be distinct. Besides the above, there is at least one, probably two, species as yet undescribed, agreeing in general appearance with these, and which would be confounded with them on a superficial examination.

As the description of Say will apply to all of these species, it is somewhat doubtful which is the one really intended by him: in fact, it is quite possible that he has confounded two or more species under the name of *fumipennis*, but the species which I have characterized under that name is apparently the most abundant in Pennsylvania, whence Say's specimens came. The description of Say reads "body minutely punctured," a phrase which is not used in the description of several allied species published at the same time, from which it is probable that the species intended by him was more coarsely punctured than the others, which also points to this species rather than either of the others mentioned above.

Languria inornata Rand., *gracilis* Newm. This species has been unfortunate in names; originally described by Latreille as *L. "bicolor* Fabr.," the name was changed by LeConte to *Latreillii*, and by Crotch to *gracilis* Newm., and *inornata* Rand. placed as a variety: but it appears that the description of Randall has priority over that of Newman, and the species should therefore bear the name *inornata* Rand.

Hispa collaris Say, Jour. Ac. Phil., iii., 433, is without doubt the

species described as *Odontota Walshii* Crotch, Pr. Ac. Phil., 1873, 81, and the species should therefore be called *Odontota collaris* (Say).

Imatidium 17-punctatum Say, *l. c.* 435, is not a synonym of *Chelymorpha cribraria* Fabr., as stated by LeConte, Say's Writings, ii., 207, but is the species subsequently described by Crotch, *l. c.* 77, as *Ch. Lewisii*, which will therefore have to be considered a synonym.

Graptodera plicipennis Mannh. = *Haltica bimarginata* Say; the description of Say has priority.

Leptura sphaericollis Say, Jour. Ac. Phil., v., 280 = *ruficollis* Say, *l. c.* iii., 421. Dr. LeConte has already noted, New Series Am. Col., pt. ii., 222, that the species are identical, but not that *ruficollis* has priority.

ON SPECIES OF MELIPOTIS.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

I propose to designate by the varietal name *versabilis*, that form of *jucunda* in which the primaries are nearly unicolorously fuscous gray without the white shading on the median space, and without the contrasting black and white of the usual and typical form. Specimens of this are in the collection of the Buffalo Society of Natural Sciences, collected by Mr. Grote in Alabama. Where the t. p. line is at all discernible, it is seen to make the same sharp indentation below the median vein as in the type. The species described by me from Texas under the name *agrotipennis* may be distinguished by the t. p. line not running in so far at this point and making an obtuse instead of a pointed angle on vein 2.

Melipotis sinualis, n. s.

♀. Belongs to the group of *jucunda*, but is larger, with the fore wings more pointed. Whitish gray; fore wings crossed by interrupted lines. T. p. line well toward the outer edge, partially obliterate and forming a distinct black sinuate streak from vein 3 (where it approximates to the margin) to vein 1 inwardly. A terminal waved line. Discal mark obliterate, faintly yellowish. Hind wings pure glistening white, with a deep black border discontinued below vein 2. A black dot on the

submedian fold at its outer extremity. Fringes white notched with black opposite the median nervules. Body gray: tegulæ lined within with black. Beneath white with broad black margin to the wings, discontinued below on secondaries; a black discal streak on fore wings. Palpi gray; second joint marked outwardly with fuscous.

Expanse 48 m. m. Aug. 6, Belfrage; No. 646, Bosque Co., Texas. Quite distinct in ornamentation and color from any species known to me.

ON AN AMERICAN SPECIES OF LOPHOPTERYX.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Among the more interesting European Ptilodontid genera not yet recognized as American (the species referred by Walker to *Stauropus* do not, according to Grote, belong to that genus) is Stephens' genus *Lophopteryx*, as restricted by Lederer. To this I would refer a species found by Mr. C. A. Blake in New Jersey, near Philadelphia, and which I do not find elsewhere described.

Lophopteryx americana, n. s.

♂. Eyes hairy: antennæ short, with long pencils of bristly hair from each joint. Primaries with uneven external margin. Bright brown in color, allied to *camelina*, but less rusty or reddish. Nervules interruptedly marked in very dark brown. Transverse anterior line single, forming two approximate obtuse teeth on the cell, dentate below median vein. Transverse posterior line double, obliterate, with included paler shade which traverses the wing obliquely, marked on costal region: a series of ante-apical pale dots; a purplish brown subterminal shade. Median space diffused, shaded with purplish brown, more apparently so before the outer line and inferiorly where the median lines approximate; a terminal brown line, interrupted on the veins, opposite to the extremities of which the exserted fringe is dark brown. Hind wings ochrey, with concolorous fringes becoming brown toward anal angle: a median pale shade, which intersects at internal margin a blackish patch. Beneath yellowish immaculate, the dots on costa of primaries before apices

repeated ; fringes brown. Body rusty brown. Tooth on internal margin of primaries not prominent. Expanse 36 m. m. Collection Buff. Soc. Nat. Sci.

This seems to be a shorter and broader-winged form than the European, in which it would conform to Dr. Speyer's law of variation in the Noctuæ. The outer line is less distinct than in the European species, of which it may be a modification.

ON PSEUDOHAZIS HERA (Harris).

BY A. R. GROTE, BUFFALO, N. Y.

Through the kindness of Lieut. Carpenter, I have received from Yellowstone Park a ♂ specimen which agrees with Mr. Walker's description of *pica* (B. M. Lists, 1318), and must be the same, although outside of the common black outer fascia the wings are tinted with yellow, while appearing white at first glance. But Walker's description seems identical with Harris' *Hera*, and his specimen is from Doubleday also. Probably the *same* specimen has been made the type of both species. Walker's locality, "United States," is indefinite, and probably not as originally given by Doubleday. Further comparisons are needed to settle the differences between *eglanterina* and *Hera*, which I have considered (Am. Phil. Soc., 1874, p. 4) as specifically identical.

It is not necessary, at this time, to analyse Audubon's plate ; for the two names, *Hera* and *pica*, are founded on *specimens*, and no name is attached by Audubon or others to the original figures. I would correct the synonymy of the two forms as previously given by me.

Pseudohazis G. & R. (1866).
(Type : *Saturnia eglanterina* Boisd.)

1. *Pseudohazis Hera* (Harris) G. & R., Ann. Lyc. N. Hist., N. Y., 8, 377; *Saturnia Hera*, Rep. Ins. Mass., 286, 1841; *Hemiluca pica* Walk., B. M. Lists, 6, 138.

Hab. Rocky Mountain Region.

2. *Pseudohazis eglanterina* (Boisd.) G. & R., Ann. Lyc. N. Hist., N. Y., 8. 377 ; *Saturnia eglanterina* Boisd., Ann. Soc. Ent. Fr., 2nd Ser., x, 323 ; *Telea eglanterina* H.-S., Exot. 60, fig. 445.

Hab. California.

CATALOGUE OF THE LEPIDOPTERA OF AMERICA NORTH OF MEXICO.

Part I—Diurnals ; by W. H. Edwards.

Published by the American Entomological Society, Philadelphia, 8vo., pp. 68. Price, $1 ; interleaved for additions, $1.30.

This work of Mr. Edwards' is conservative in its character, and as such is most refreshing : after having tried in vain to fathom the innovations with which we have for the past few years been perplexed, this excellent catalogue comes to our rescue, and will, we feel sure, be appreciated by all who do not believe in the excessive multiplication of genera and their establishment on minute and often variable characters. Here the dear old familiar names are nearly all in their places again, and we go back to the time-honored method of heading our collections with *Papilio*, and embracing in it some 22 species. For ourselves, we have for some time past been literally at sea in reference to names for butterflies, wandering about without chart or compass to direct us ; we scarcely knew the name of any species, and didn't expect ever to have the time or disposition to master the new names proposed, and hence we have been so discouraged that we have done really nothing to our collection of butterflies for a long time past. We are not disposed to object to changes in nomenclature where it can be made to appear that a *necessity* for such modifications exists, but we have been unable to see any good reason for adopting the wholesale changes which have been proposed, and we believe that the great bulk of working Entomologists hold the same view. With a catalogue now more to our mind, sufficiently progressive, and, at the same time, a most convenient help, we shall be able to classify our species under genera we can comprehend, and go to work with a will again.

In the general arrangement the author, while adopting and incorporating some of the work of later systematists, adheres mainly to the order of Doubleday and his associates in the "Genera of Diurnal Lepidoptera," and where the genera have numerous species, as in *Colias*, *Argynnis*, *Thecla*, *Lycaena*, *Pamphila*, &c., they are for the sake of convenience divided into sections. In crediting genera the author strictly follows the rules adopted by American Entomologists at the recent meeting in Buffalo, and appends the name of the party who first gave the genus a proper definition. For this reason Hübner's genera are excluded

and two of the genera made by Mr. Scudder in the Hesperidæ, *Amblyscirtes* and *Pholisora*, have been credited to Dr. Speyer because his definition of them is the first published. With regard to Mr. Scudder's genera, we think he should have had credit for them. We all know what pains-taking and unsparing effort he has bestowed in laboring to introduce what he conscientiously believes to be needed reforms in Entomological nomenclature, and although the present generation of Entomologists is not disposed to adopt such wholesale reform as he proposes, he is undoubtedly *deserving of full credit* for any of his material which may be used. His work on New England Butterflies, in which all these genera are minutely defined, has long been written, but its expensive character has been an obstacle in the way of its publication. Under these circumstances, *which are very exceptional*, we regret that Dr. Speyer's references of these genera to Scudder have not been followed.

There are 506 species enumerated in this list, embraced in 64 genera. There are also references by the use of a system of special signs to all writers who have treated of the preparatory stages of our butterflies, no matter how briefly; we regard this as an excellent and valuable feature in the work. The catalogue is in every way well got up, and we hope all our readers will procure a copy of it, and if, after they have given it a careful perusal, they think as well of it as we do, they will set to work and arrange their collections in accordance with it, feeling profoundly thankful to the author for the timely relief he has afforded.

NEW SPECIES OF NOCTUIDÆ.

BY W. V. ANDREWS, BROOKLYN, N. Y.

Acronycta Walkeri, n. s.

F. W., upper side—Wing-stretch,* 1.5 in. General color brownish gray. The costal edge has ten small, dark brown, irregular marks, and

* Perhaps I ought to apologize for coining a word in the above description—"wing-stretch." I hold it, however, to be a legitimately formed word, and I believe that in giving a description in English no foreign word or abbreviation should be used, if an English word, with the same meaning, can be found or formed.

four of these, those nearest the base of wing, are nearly enclosed by a dark brown, semi-circular line, which also encloses a basal patch, not distinct in color from the rest of the wing. Fringe of the wing light gray. A row of seven or eight dark brown, oblong spots on outer margin, probably lying betwixt the nervules, and very distinct. The "Acronycta mark" is almost of the shape of an anchor. Reniform stig. light ochrey brown; orb. stig. light gray.

All the transverse lines are very dark brown, edged interiorly with white or light gray, very zigzag; the subterminal and elbowed lines coalesce.

H. W., upper side—Light gray, nearly white, with a small discal brown spot, probably sometimes absent. Fringes and outer marginal spots as in f. w., except that the spots are less distinct, and almost form a line. Under sides of both wings light gray, growing darker toward the margins. The marginal spots as on the upper side. Fore legs annulated; the others gray with dark patches. Head, antennæ, patagia and thorax dark brown. Abdomen of a lighter color, but slightly darker than its under side, which, as well as the under thorax and palpi, are concolorous with the under side of wings. Last joints of palpi dark brown, and it is very probable that in some specimens all the "dark browns" may be "blacks."

With the exception of *funeralis*, this is the prettiest *Acronycta* that I know. N. J., Coll. W. V. A.

Orthosia lutosa, n. s.

F. W.—Wing-stretch 1.5 in. Color brownish gray, slightly darker on the outer margin, where the nervule interspaces are ornamented with seven dark brown, Y-shaped marks, sometimes confluent. A black or dark brown spot at apex of discal cell. Under side rather lighter in color. A brown crescent mark open towards costal edge—25. in. from apex.

H. W.—Basal space rather lighter in color than the f. w.; marginal space nearly as dark. A small, faint, brown discal spot. Under side concolorous with upper, the discal spot much more distinct. All fringes brownish gray and short.

Antennæ concolorous with f. w. Head, thorax and palpi densely clothed with light gray hairs. Abdomen .5 in. long, concolorous with h. w., darker underneath. N. J., Coll. W. V. A., 3 specimens.

CORRESPONDENCE.

THE HESSIAN FLY, JOINT WORM AND WHEAT MIDGE.

Specimens of these destructive insects in all their stages of maggot *(larva)*, chrysalis *(pupa)* and fly, are earnestly desired by the undersigned from all parts of the country, particularly the south and west, in order that he may ascertain their distribution and study their natural history, with reference to their ravages. Specimens may be sent alive in stout paste-board boxes, or better, in tin boxes. The soft maggots should be forwarded in vials containing cotton soaked in alcohol, by mail. It may be remembered that the Hessian Fly and Joint Worm live near the roots of the wheat plant, causing swellings in the stalk, while the Midge lives in the ear. Accounts of these insects, with a map showing their distribution in the United States, will soon be published by Hayden's United States Geological Survey of the Territories, and extra copies of the report may be obtained of the author. Address parcels containing specimens and requests for the report to

A. S. PACKARD, JR., Salem, Mass.

I have great pleasure in informing you that a new Entomological Society has been formed in this city, under the title of "The Long Island Entomological Society." The following are the officers:—

Rev. Geo. D. Hulst, President; John Akhurst, Vice-President; Thos. Stearns, Treasurer; P. Elbert Nostrand, Rec. Secretary; W. V. Andrews, Cor. Secretary; Fred. Baldwin, Librarian; Chas. Leng, Curator.

W. V. ANDREWS, Cor. Sec'y L. I. E. S.,
187 State St., Brooklyn, N. Y.

I captured a *Meloe* on the 17th of April. I have also in two instances this spring found a male *Cicindela purpurea* paired with a female *C. vulgaris*. May not this sort of thing account for some of the remarkable variations among the *Cicindelidæ*? J. A. MOFFAT, Hamilton, Ont.

Notes on "Fondness of Larvæ for Water" would have appeared in this issue, but we have mislaid the letter containing the name of our correspondent. Would he kindly furnish it again?—ED. C. E.

The Canadian Entomologist.

VOL. IX. LONDON, ONT., JUNE, 1877. No. 6

ON A NEW CANADIAN CRAMBUS ALLIED TO CONCHELLUS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Mr. Wm. Saunders has collected a species of *Crambus*, which is apparently unnoticed by Prof. Zeller or Dr. Clemens, who have written most frequently on our American species. The new species, which I call *C. interruptus*, is very easily recognized and has been figured by Prof. Townend Glover on his Plates of Lepidoptera. The head is white ; palpi inwardly and beneath white, outwardly dark brown. Thorax white, patagia bright brown. Hind wings and abdomen pearly gray. Fore wings bright brown with a longitudinal white median band obliquely interrupted at the middle of the wing by the ground color. Beyond is a white block on the outer half of the wing, with its inner and outer edges inwardly oblique and its upper edge longer than its inferior margin. Beyond this, before the external margin, is a white band, following the shape of the wing and discontinued above and below. The brown space between this band and the block of white is narrower above than below. In this simply marked species the whole ornamentation seems to be limited to a longitudinal white band, widening outwardly and interrupted mesially and subterminally obliquely by the brown ground color of the wing. There is a sub-obsolete series of minute terminal black points ; fringes fuscous, interrupted with white at the middle of the wing and again near internal angle. Beneath the hind wings are almost white ; the fore wings shaded with fuscous.

When we compare *C. interruptus* with the European *C. conchellus*, we see that the pattern of ornamentation is very similar in the two forms. The American species differs by the white band before the external margin. In *C. conchellus* there is merely the basal vitta and the outer block of white

scales, and this latter is much larger than in *C. interruptus*. The hind wings are darker in *C. conchellus*, and the thorax and head not so purely white.

C. interruptus has also been taken at Grimsby, Ont., by my kind friend, Mr. J. Pettit. I have seen no specimens from New York State yet, but it will probably occur with us. Its average expanse is 21 mil. For a fine series of *C. conchellus* I am indebted to Prof. Zeller, of Stettin.

A NEW GENUS OF APHIDÆ.

BY J. MONELL, MISSOURI BOTANIC GARDENS, ST. LOUIS, MO.

Colopha, nov. gen.

Antennæ six jointed, wrinkled transversely, and almost moniliform.
Front wings with three discoidals; the cubital once-branched.
Hind wings with one oblique vein.
Wings in repose, usually horizontal.

C. ulmicola (Fitch)—*Byrsocrypta ulmicola* Fitch, N. Y. Rep., ii., 347. *Thelaxes ulmicola* (Walsh), Proc. Phil. Ent. Soc., i., "American Entomologist," vol. i., 108.

The above-mentioned species was originally described by Dr. Fitch (N. Y. Rep., 347), who had not seen the winged form, as *Byrsocripta ulmicola*. The winged individuals were first described by the late Prof. Walsh, who removed it to "*Thelaxes* Westw." Judging alone from the original description of *Thelaxes* in the "Synopsis of British Genera of Insects," it would be almost impossible to say whether this insect is a *Thelaxes* or not; but Prof. Westwood states in his "Arcana Entomologica" (ii., p. 64) that his genus *Thelaxes* is synonymous with *Vacuna* Kalt.; and since, in addition to other differences, *Vacuna* has five-jointed antennæ, it is evident that our insect can not belong to that genus, and as I can find no generic description which will at all agree with this, either in our American authorities or in Koch, Kaltenback and Passerini, I have presumed it to be new and described it accordingly.

The bibliography of this species really seems like a "Comedy of Errors." Dr. Fitch placed it in a wrong genus; Mr. Walsh removed it to *Thelaxes* and refers to N. Y. Rep., ii., 257, instead of ii., 347. In the "American Entomologist" it is indexed for *p. 224.* instead of *p. 108.* Mr. Packard (Guide, p. 525) mentions *Thelaxes ulmicola* Walsh, while on the next page he speaks of *Pemphigus ulmicola* (Fitch), and refers to figure *525*, which is from an electrotype of the identical wood-cut first published by Messrs. Walsh and Riley in the "American Entomologist," under the name of *Thelaxes ulmicola* Fitch. Mr. Packard's figure *525* is, therefore, evidently my *C. ulmicola*, and, indeed, I have so far failed to find any other mention of a *Pemphigus ulmicola* Fitch.

NEW PYRALIDES.

III.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Botis vibicalis Zeller, Beitr. ii., 8, Taf. iii., fig. v.

By error in text "*ribicalis;*" correction pages 9 and 131. One of the smallest forms, looking like a minute Heliothid. Fore wings pale yellow with a purple, oblique inner band and an outer of the same hue running parallel with external margin and connected along internal margin with the first band. Hind wings fuscous. Texas (Belfrage, No. 407), August 20th.

Botis nasonialis Zeller, Beitr. ii., 9, Taf. iii., fig. 6.

Texas (Belfrage, No. 406), June 15th.

Botis coloradensis G. & R.

Also from Texas, taken by Belfrage April 25 (No. 379). This species may be known by the white immaculate secondaries. The lines on the primaries are ochreous; in the colored copies of the original plate these lines are incorrectly left black.

Botis atropurpuralis, *n. s.*

Allied to *vinulenta*. Fore wings of an obscure reddish brown with a purple cast. At first sight appearing immaculate, but the exterior line can be made out by its being followed by scattered yellowish scales; it is similarly shaped to that of *vinulenta* (= *signatalis* ‡), but not angulated on submedian fold. The stigmata are not obvious. The anterior line is partially shown in the same way as the outer line. Hind wings fuscous, paler at base; fringes paler and narrowly interlined. Head and thorax like fore wings. Beneath the body is silky whitish. Wings beneath fuscous with a slight lilac reflection, without obvious markings except on secondaries an indication of a mesial line.

Expanse 15 mil. Texas, Belfrage (No. 362), Sept. 12.

Botis onythesalis Walk.

Larger and with longer body than *sumptuosalis;* similarly colored. Orange yellow; terminal space on both wings shaded with purplish fuscous. Median space on primaries variably washed with purple red. Lines purple, shaped as in *sumptuosalis*, but the outer line running in more deeply on vein 2. Beneath the fore wings are less brightly colored, with the fuscous terminal shade repeated and the discal marks indicated. Above the secondaries show an oblique mesial line, and beneath this is reflected. Body above orange yellow, beneath with legs whitish.

Expanse 19 mil. Hab. Texas, Belfrage (Nos. 364 and 365), March 26, May 25.

Botis Harveyana, *n. s.*

A small species more slender than *communis*, with pale brown primaries, the exterior line fine, blackish, obsoletely denticulate, rather suddenly drawn in at vein 2, thence back again and angulate before the margin. Outer spot large, annulate. Inner spot obsolete. Before the fringes, which are faintly interlined with pale and are discolorous, there is a distinct sinus of dark points. Hind wings paler than primaries, washed outwardly with the same brown as primaries, with a distinct discal dot and median line. Beneath more ochreous, with the discal dots double on hind wings; a common exterior line; on the primaries the veins are partially darker marked: terminal points very distinct and continuous. Head, palpi and thorax above pale brown, beneath concolorous with under surface of wings glistening.

Expanse 18 mil. New York, L. F. Harvey, July 27 ; Texas, Belfrage (without number, among *communis*), Sept. 25.

Botis flavidissimalis, *n. s.*

Size moderate. Entirely bright deep yellow, saturate with this color above and below. Costal region of primaries at base a little deeper tinged, and the thorax in front a little ochreous. Under surface of body and legs whitish : fore tibiæ marked with brown ; palpi dark ochreous, white beneath. Fore wings with two stigmata, dark, nearly solid, the outer annulate. Lines blackish, fine, dentate ; the outer line much bent in to below the outer spot, thus differing from *citrina*, and continued on secondaries. No subterminal line. A terminal series of ochrey points on both wings. Fringes pale yellow. Eyes with a white line. Beneath the costa of primaries is shaded with ochreous ; both stigmata repeated ; a common exterior line.

Expanse 19 mil. Texas, Belfrage (No. 383), June and August.

Botis catenulalis, *n. s.*

Larger than *ventralis*. Entirely brown, not opalescent. Fore wings with the exterior line not greatly indented below vein 2, and followed by a series of dull yellowish spots opposite the scalloping of the line. Discal spots annulate : all three present ; the inferior (claviform) spherical. The transverse anterior line faintly preceded by a pale shade. Hind wings paler than primaries, especially towards internal margin, crossed by a line corresponding to the outer line of primaries, not much indented, continuous, lunulate, the indentations filled in with pale spots as on fore wings. An even dark brown terminal line ; fringes paler than wing, whereas on primaries these are concolorous. Beneath paler than above with the outer common line distinctly repeated as well as the stigmata on fore wings. Head and palpi brown above, white beneath.

Expanse 26 mil. Hab. California ; Coll. Buff. Soc., from Mr. Meske.

Botis fracturalis Zeller.

Collected by Dr. Shannon in Southern Texas ; also by Belfrage, Nos. 385 and 384 ; varies in color of fore wings as does *argyralis*. March and April.

Eurycreon communis Grote.

Varies excessively in color. Dark wood brown or fuscous specimens

were collected by Belfrage (Nos. 372, 375) on the 25th and 26th of March. On the 5th of November one with red brown primaries. Clypeus with frontal protuberance; a darker form than *rantalis*, formerly incorrectly referred by me to *Botis*.

Botis tatalis, *n. s.*

A single male specimen (No. 659, Nov. 7). The hind wings are yellow ochre with a subterminal dark line and a trace on the middle of the wing of a mesial line. A discal spot near the base of secondaries, which beneath are ochrey and immaculate. Primaries and thorax dark brown; ornamentation like *communis*, than which this is larger winged. Subterminal shade indistinct; fringes darker than the wing. Beneath fore wings ochrey with a trace of the external line at costa; outer discal spot large, black, inner quite small. Head and thorax above brown; beneath with the legs, pale ochre. Hind wings appear wider and very different in color, almost yellow above, as compared with G. & R.'s figure of *posticata*. I have not their type, but from recollection it is not the present species, which may be known by the subterminal shade on the ochre-yellow hind wings, which contrast with the brown.

Expanse 20 mil.

Of all the species of N. Am. Pyralides described by Grote & Robinson, *Botis posticata* is the only one I do not recognize in the Collection of the Buffalo Society of Natural Sciences. The type may be in Philadelphia or New York. I thought for some time that *communis* might be identical with it, but it will need a comparison of specimens to decide the matter.

Botis penumbralis, *n. s.*

Allied to *terrealis*, but much larger. Of the same silky gray-fuscous, but stained with yellowish on the veins, the costal margin of fore wings and narrowly along the terminal border of both wings. Abdomen and thorax above yellowish; head, palpi, fore legs and pectus in front obscure yellowish. Thorax and abdomen silky whitish. On the wings the lines are diffuse. No subterminal shade, no stigmata, the cross-vein being indicated by yellow scales. The lines are fuscous, sub-dentate, shaped much as in *terrealis*, but without costal accentuation. This is a more robust species than *terrealis*, and its ornamentation more simple. Beneath the wings are pale silky fuscous, reflecting the common outer line. Fringes pale fuscous, not interlined.

Expanse 31 mil. Ohio (Mr. Drury).

Botis socialis, n. s.

Fore wings triangulate, widening outwardly more than usual. Ground color pale yellow washed with red, especially beyond the outer line, where a broad, diffuse, blackish subterminal band forms the most prominent marking of the wing and appears purplish from overlying bright scales. Transverse lines blackish, linear, trembled. Stigmata small, both solid. Outer line not strongly indented below median vein. Fringes pale, silky, very faintly interlined. The terminal edge of the wing is narrowly red. In one specimen the red shades are more or less absent, leaving the subterminal shade blackish. Hind wings pale yellow, with the subterminal broad shade more or less obviously continued; fringes pale. A fine mesial line. Beneath very pale sericeous yellow, with the subterminal shade and fragments of the exterior line repeated. On primaries discal marks repeated. On fore wings in one specimen the fringe is a little fuscous above. Body yellowish, paler beneath.

Expanse 25 mil. Canada, Mr. Saunders; Buffalo, Mr. Zesch.

Botis allectalis, n. s.

♂. Size of *communis*, but with more pointed primaries and longer abdomen. Gray over fuscous, with a pale ochreous discal patch on the median space surrounding the stigmata. These latter distinct, solid, dark fuscous, the oblique orbicular probably sometimes with paler centre, as it is faintly so on one wing. The lunate reniform followed by a fuscous shade margining the ochreous patch outwardly. T. p. line denticulate with a whitish included shade, setting out the line, not much indented below median vein. The gray scales overlay the fuscous, and when the wing is rubbed are first lost. The costa to t. p. line is ochrey fuscous. Hind wings translucent fuscous with pale line and darker borders. Head and appendages ochrey fuscous. Beneath paler with stigmata and exterior common line apparent.

Expanse 23 mil. Belfrage (No. 445), May 12, Bosque Co., Texas.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

HELIOZELLA.

H. ? æsella. N. sp. ?

I am but imperfectly acquainted with this genus, knowing it only through the Nat. Hist. Tin., vol. xi.; and the plan of that work does not seem to admit of details of structure. If it is equivalent to *Acchmia*, *Perittia*, *Tinagma* and *Douglassia* combined, as those genera are limited in Ins. Brit., v. 3, then the proper place for this species is in it. But if, as I conclude from the account in Nat. Hist. Tin., it is the equivalent of *Tinagma* alone, and the other groups above mentioned are good, distinct genera, then this species, while possessing affinities with all, would be out of place in either. In Ins. Brit. Mr. Stainton places in *Tinagma* three species, *sericiellum*, *stannellum* and *resplendellum*. In Nat. Hist. Tin. these three species, with the comparatively new species *lithargyrella* Zell. and *grisescens* Staint., compose the genus *Heliozella*, none of the species placed in *Acchmia*, *Perittia* or *Douglassia* in Ins. Brit. being placed in it. Prof. Zeller has since (Beit. z Kent, May, 1873) described from Texas a new species, *H. gracilis*—the only species heretofore met with in this country. Possibly *æsella may* prove to be identical with *gracilis*, but I think not, and the particulars in which they differ will be indicated below. Some of these points of difference are structural, based upon the supposition that *Heliozella* is identical with *Tinagma*, as characterized in Ins. Brit., v. 3. For instance, in *Tinagma*, as there characterized, *there is no tongue*, the *ciliæ are long*, the antennæ short, stout and *very much compressed*. In the species before me the tongue is as long as the thorax and naked (as in *Douglassia*); the antennae as stout and thick, not half as long as the fore wings, *not compressed* (unless by "closely compressed" is meant that the joints are closely set), *they are microscopically pubescent, and with a minute basal joint as in Acchmia;* and the ciliae have no unusual length, but are rather coarse. I do not detect the marked demarcation between the wings and the ciliae which Prof. Zeller describes in *H. gracilis*, nor are the wings posteriorly so much narrowed and pointed as from his description I infer them to be in that species. Certainly the hind wings are not so much so as in either *D. venerostomella* or *T. serici-*

ellum, as these are figured in Ins. Brit., *though the neuration is exactly that of oenerostomella.* I have not examined the neuration of the fore wings, but the shape is very nearly that of *sericiellum*, *loc. cit.* The labial palpi are those of *Tinagma sericiellum :* and the maxillary palpi are about equal to the first joint of the labial.

The ornamentation is that of *Tinagma*, and of the other genera above named as well. There are the usual two silvery white dorsal spots, one near the base, the other at the anal angle ; the latter *is not a triangle*, as it is described in *gracilis*, or if it is triangular, the apex is very obtuse ; it points a *little* obliquely backwards ; the other lies parallel to it, pointing also a little backwards, is of the same length but narrower, and reaches the fold. Hind wings pale fuscous ; ciliae grayish fuscous. Otherwise the entire insect is of a rich brown, but glittering so with metallic reflections that it is difficult to get a good view of its true color. These reflections from the wings, thorax and abdomen are brassy, or rather bronze ; from the head, palpi and under surface of the abdomen, silvery or like burnished steel ; the antennae are of the same color with the fore wings, the legs are a little paler. Wing expanse, 2½ lines.

Described from a single specimen taken April 24th, resting on the body of an apple tree (on the edge of a forest, however,) near Covington, Kentucky. I did not observe anything peculiar in its position in the hasty glance which I gave it, and, indeed, was under the impression that it was an early specimen of *Aspidisca splendoriferella* Cham. In Europe species of *Heliozella* are said to appear flying in hot sunshine in May and June. In ten years of dilligent observation, I have never met with a mine resembling that made by *H. resplendellum* (the only species of which the larva is known), except in July and August, 1875, in the region of Mammoth Cave. There a mine was not uncommon in Chestnut leaves. It was a narrow line beginning always by the side of a lateral rib, running thence towards but not to the edge of the leaf, then crossing over the space to the next rib, and passing along beside it down to the midrib, which it entered and burrowed along down it towards the stem, emerging from the midrib through a little slit, looking like two minute half parted lips. I never saw the larva, and saw no trace of its having left the midrib, and cut out from the cuticle of the leaf an oval case in which it might descend to the ground and pass the pupa state like *H. resplendellum*, in Alnus leaves.

I believe I have already somewhere alluded to the connection which

exists, or which I fancy to exist, between these small genera of *Glyphipterygidæ* and the *Elachistadæ* of Mr. Stainton's classification. I can not now refer to the place where I have alluded to the subject, nor am I altogether certain that I have published the observations which then suggested themselves on this subject, as at that time I only knew the *Glyphipterygidæ* through the writings of other Entomologists. But it certainly seemed to me that the larvæ of the above-mentioned genera of small species being unknown, there was nothing in the structure of the imago to exclude them from the *Elachistadæ*, though the larger genera, *Ascalepia*, *Glyphipteryx*, etc., were allied sufficiently nearly to the *Gelechidæ*. But such species as *Æchmia dentella* and *Lithariapteryx abroniædla* unite these small genera and *Glyphipteryx*, so that they cannot be placed in separate families, though the apodal larvæ of *Antispila*, *Heliozella*, etc., do not offer any strong affinities with either *Glyphipterygidæ* or *Elachistadæ*. While, therefore, it is true that these small genera can not be separated from *Glyphipteryx* and placed in a different family because of being so connected, nevertheless, taken by themselves, in the imago, they still seem to me to show strong affinities with the *Elachistadæ;* and, indeed, the older Entomologists placed the European species of *Antispila* in the genus *Elachista*. Do the *Glyphipterygidæ* afford a passage from the *Gelechidæ* to the *Elachistadæ* ?

DESCRIPTION OF A NEW TEXAN ANISOTA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

The following species, new to the fauna of the United States, have been collected by Mr. L. Heiligbrodt, in Bastrop Co., Texas, and the types are contained in the beautiful collection of my friend, Mr. Otto Meske, in Albany.

Anisota Heiligbrodti, n. s.

♂ ♀. The antennæ of the male are broadly bipectinate, except at the tips ; those of the female are simple. This species differs from its allies by its purely gray color and by the fore wings being covered by two nar-

row blackish lines. The first of these is sub-basal, irregularly sinuous, produced on the disc; the second is regularly scalloped, interspaceally waved, and runs from apical third to internal margin. The wide median space has a more purely whitish ground, while the wing everywhere is thickly dusted with dusky cells. The usual discal mark consists of two superposed white spots duskily ringed. Hind wings of the same gray with the disc bright rose color, enclosing a large round black discal spot and outwardly limited by a faint mesial band visible towards anal margin. Beneath of the same gray, with the round black discal spots repeated on both wings; the primaries alone are rose color at base, and there is a trace of a common extra-mesial band. Body gray with the sides of the abdomen tinged with roseate.

Expanse, ♂ 2⅛ inch.; ♀ 3 inch.

Anisota Hiilighrodti, which is named for its discoverer, approaches certain southern species in form, which have been referred by Dr. Boisduval to *Adelocephala*.

NEW SPECIES OF ORTHOPTERA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Caloptenus angustipennis, n. sp.

General color light brown. Upper part of pronotum and hind femora with a reddish tinge. Face sometimes mottled. Antennæ light brown infuscated apically. The usual black band behind the eye broad and distinct, and reaching last division of pronotum, bounded below by a narrower white stripe. A broad white stripe from base of elytra connects with a white stripe at insertion of posterior femora, forming a right angle. Outside of hind femora is crossed by two indistinct dusky bands that extend upon upper edge. Lower sulcation reddish. Knees black. Hind tibiæ blue. Elytra light brown with very small black spots in the disk.

Frontal costa depressed at ocellus. Head but slightly elevated above pronotum. Foveola of vertex scarcely depressed. Carinæ of pronotum nearly obsolete; the median cut by three transverse incisions. Hind lobe of pronotum slightly rugulose. Elytra extending beyond abdomen, un-

usually narrow. ♂ cerci small, narrow, straight, tip rounded and sulcate. Tip of abdomen notched, as in *C. spretus*, but the notch is wider. Length ♀, .95; ♂, .90 inch. Elytra ♀, .75; ♂, .70 inch. Hind femora ♀, .56; ♂, .50 inch.

Banks of the Elkhorn River, Dodge County, Nebraska. August and September.

Caloptenus volucris, n. sp.

Head unusually large. Frontal costa slightly depressed at ocellus, broadening below. Punctate above ocellus. Pronotum slightly constricted in middle. Median carinæ distinct, but slight; cut by last transverse incision. Lateral carinæ distinct only on posterior part of pronotum. Elytra longer than abdomen. Posterior femora equals abdomen in length. In dried specimen the face is brown, occiput and pronotum a shade lighter. The usual black stripe behind eye to last lobe of pronotum, and testaceous spot below. Elytra light brown, darkest at base, unspotted. Oblique yellow stripe on side of body. All the femora reddish yellow above, the posteriors black at tip, with three brownish patches on upper edge. Hind tibiæ blue with black spines, and narrow, black, basal annulation. Under side of thorax and abdomen yellow. Antennæ red, darker at tips. Terminal segment of abdomen pointed. Cerci broad at base, rapidly tapering to the middle. The apical half scarcely tapering and ending in a blunt point. Length ♂, .85 inch. Elytra ♂, .70 inch. Hind femora, .45 inch.

Rare and local so far as observed. Habitat, Glencoe, Neb. Time of appearance, September. This species is very close to *Pezotettix autumnalis* Dodge, and differs chiefly in the length of the elytra and wings.

Caloptenus plumbum, n. sp.

Frontal costa sulcate only at ocellus. Vertex slightly sulcate. Median carina of pronotum distinct, cut about the middle by last transverse furrow. Hind border of pronotum angled. Elytra and wings extend beyond the abdomen. Cerci broadest at base and straight until near the apex, when they bend upward—the upper side with a gentle curve, the lower making an obtuse angle—and end in a blunt point. Tip of abdomen rounded.

Color dark inclining to blue. Pronotum with a red, longitudinal

median stripe. Black band behind eye, broadest on pronotum, ending at last sulcus. Yellow spots behind the eye on both sides of black stripe and below the same on side of pronotum. Cheeks bordered behind with yellow. Sometimes face yellow, mottled with blue. A yellow spot at base of antennæ, and a yellow stripe following the lateral carinæ of pronotum on hind lobe, runs obliquely across base of elytra to insertion of hind femora. Elytra brown, with a few dusky dots along the disk. Wings tinged with blue. Upper outside face of hind femora dark blue, the upper edge crossed by the usual dark bands. Hind tibiæ red with black spines. Antennæ light red. Entire under side of insect yellow.

Length of body ♀, 1.00 inch.; ♂, .85 inch. Of hind femora, male and female, 0.50 inch. Elytra ♂, .75; ♀, .80 inch.

Two ♂, four ♀. Found in low grounds during the month of Sept., at Glencoe, Nebraska. Possibly a local variety of *femur-rubrum*.

Pezotettix abditum, n. sp.

Medium size. Frontal costa punctured, depressed at ocellus. Vertex sulcate. Occiput faintly carined. Median carina of pronotum slight, cut by last transverse incision. Lateral carinae obtuse. Elytra short, oval, pointed. Last segment of male abdomen acuminate. Cerci short, broad at base, of equal width from middle to apex. Tip broadly rounded.

General color dark brown. Antennæ red, darker at apex, sides of face and pronotum yellow. The usual black stripe behind the eye; narrow on pronotum and ending at last sulcus. Elytra dark brown, spotted obscurely and irregularly with black. Hind femora dusky without, with three indistinct black bands that cross over the upper edge and appear on the inside, the one nearest the knee usually broadest and crossing the inner face. Inside and below yellow. Hind tibiae red, spines black. Under side of whole insect bright yellow.

Length of body ♀, .70 inch.; ♂, .65 inch. Elytra ♀, .27 inch.; ♂, .23 inch. Hind femora ♀, .45 inch.; ♂, .40 inch.

Three ♀, three ♂. Taken at Glencoe, Nebraska, where it is usually abundant in August. It occurs upon hill sides, near damp ground, among the rank herbage common in such situations.

NOTES ON LIMENITIS PROSERPINA AND ARTHEMIS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Last fall I obtained a few eggs from a female *L. proserpina*, in Sept., while in the Catskills, and raised eight larvæ to hybernation, which took place after third moult. This spring I have carried four of these to maturity with the following results: The first chrysalis gave butterfly this morning (April 29th), a male *arthemis*. For some hours before the emergence the white band of *arthemis* was distinctly seen through the wing case. The second was but a few hours younger and during this afternoon has given *proserpina* male. I expected this, as here there was no white band on the wing case. The third and fourth produced *arthemis*, making three *arthemis* and one *proserpina*.

After hybernation the fourth and fifth moults took place. As *disippus* undergoes five moults in same way, I presume *ursula* will be found to, and that it is the rule for this genus, in this country at least. We know that *proserpina* is found flying with *arthemis* in the White Mountains and Catskills, and probably in the Adirondacks. But I have never seen it from Canada, though *arthemis* roams over British America from Nova Scotia to low down Mackenzie's River. Can you or can any of your readers tell me whether this form *(proserpina)* has been taken in Canada, or British America, and where, if at all? I wish to get the northern limits of the form, preparatory to illustrating the species in Butterflies N. A. I should be glad to receive letters on this matter from any one who can give the information I seek.

A NEW GENUS AND SPECIES OF GEOMETRÆ.

BY A. R. GROTE, BUFFALO, N. Y.

Meskea Grote (n. g.)

This genus of *Geometræ* resembles *Tornos;* the fore wings are larger and with the apices more produced; the external margin is longer and more oblique. The hind wings are narrow and lanceolate, with the apices pointed and a little depressed: external margin straight or a little incurved. The female abdomen is like that of *Tornos*, and is thickly tufted at the

extremity. This singular genus, which I name for Mr. Meske, may be at once distinguished by the pointed secondaries, narrower in proportion than in any other genus of the group, while the primaries are disproportionately large with straight costa and produced apices.

Meskea dyspteraria Grote (n. s.)

♀. Fore wings of the same cream color as lighter specimens of *Tornos*, shaded outwardly on the interspaces with dusky and dotted with dark scale points. The dusky shades become linear between the median nervules, before a fine white interrupted subterminal line near the external margin. The costal edge shows a few separated dusky dots; there are no traces of the median lines: the cell is shaded with dusky, lined on either side diffusely with whitish towards its inner extremity. Hind wings blackish with a white median band showing a series of dark points; anal angle washed with ochrey; a fine terminal black line relieved by a narrow ochre shade. Above the median band is a deeper black discal shade. Body like fore wings. Beneath the wings are much as above, but darker, with the fore wings more mottled with dusky. Antennæ of the female simple. Expanse $1\frac{3}{16}$ inch.

The type of this species is contained in Mr. Meske's collection in Albany, and was taken by Mr. L. Heiligbrodt, in Bastrop Co., Texas.

CENTER, N. Y., ENTOMOLOGICALLY CONSIDERED.

BY JAMES S. BAILEY, A. M., M. D., ALBANY, N. Y.

Center is situated on the line of the New York Central Railroad, midway between Albany and Schenectady. The road in reaching this point traverses a distance of eight miles from Albany, and attains an elevation of 315 feet above tide-water.

During the warm months there are two daily trains stopping at this station, going east and west, and are so arranged as to give the scientist the advantage of the first half of the day on the ground. The place itself is not in the least attractive, consisting of but a few dwellings erected for the accommodation of the Railroad employes.

It is among the pine barrens and seemingly unfertile and inhospitable soil where is found so much to interest and instruct the student, for here

he can commune undisturbed with nature, and at each step find his pathway strewn with objects of interest. Center has a world-wide reputation botanically and entomologically. The collecting ground is embraced in a tract of one thousand acres, which civilization has never disturbed, but has allowed to remain in its primitive condition. It is now owned by a community of Shakers, living in close proximity.

The entomological tract is situated on the south side of the Railroad, and lies on both sides of the road leading to Sloans, any great divergence from which will not prove successful to the collector. It is unnecessary to traverse this road more than one mile, which brings you near to Mount Brizo, which is a bold projecting sand mound rising abruptly nearly to the height of 100 feet above the surrounding country on the east and gradually sloping to the west.

Upon this point has been found annually a few specimens of *Nisoniades Brizo*. During the last summer the number found was limited to a single pair.

The collecting ground has been subject to accidental visitations of fires, which have proven very destructive to the timber and shrubbery. During the last year a fire broke out and burned over 300 acres of timbered land before it could be subdued. The timber was supposed to be destroyed, but, fortunately, later in the season, the foliage put forth with renewed vigor and beauty. Later in the season another fire occurred, but as to the extent of damage done the writer is unable to determine; but many food-plants, caterpillars, pupæ and imagines must have perished in the flames.

The following Lepidoptera have been taken at Center during the last ten years. It must also be a rich field for the Noctuidæ, but as yet sugaring has not been practiced in the vicinity.

It is proposed to sugar systematically and persistently during the coming season, and if successful, the result will be given at another time.

PAPILIONINA, H. S.

Papilio, L.

Papilio turnus, L.
" troilus, L.
" asterias, Fab.

PIERIDES, B.

Pieris, Schrank.

Pieris rapae, L.

Colias, Fab.

Colias philodice, Godt.

RHOPALOCERA.

Argynnis, Fabr.

Argynnis myrina, Cramer.
" bellona, Fabr.
" atlantis, Edw.
" cybele, F.

Nymphalides, B.

Melitaea tharos, Drury.
" nycteis, Doubleday.
" Batesii, Reakirt.
" Harrisii, Scudder.
" phaeton, Drury.

Limenitis, Fabr.

Limenitis disippus, Godart.
" ursula, Fabr.
" arthemis, Drury.

SATYRIDÆ, Swainson.

Neonympha, Hüb.

Neonympha eurydice, Fabr.
" canthus, L.

LYCAENIDÆ, Fabr.

Thecla, Fabr.

Thecla strigosa, Harris.
" calanus, Hüb.
" irus, Godt.
" augustus, Kirby.
" melinus, Hüb.
" humuli, Harr.
" niphon, Hüb.

Polyommatus, Latr.

Polyommatus americana, Harris.
Lycaena neglecta, Edw.
" lucia, Kirby.
" Scudderii, Edw.
" comyntas, Godt.

HESPERIDÆ, Leach.

Ancyloxypha, Feld.

Ancyloxypha numitor, Fab.

Hesperia, Latr.

Hesperia sassacus, Scud.
" leonardus, Harris
" bimacula, Gr. & R.
" mystic, Edw.
" otho, Sm. & Abb.
" peckius, Kby.
" viator, Edw.
" maculata, Edw.
" massasoit, Scud.
" hianna, Scud.
" verna, Edw.
" metacomet, Harris.
" zabulon, B.
" delaware, Edw.
" vialis, Edw.

Thanaos, Bd.

Thanaos juvenalis, F.
" martialis, Scud.
" persius, Scud.
" Brizo, B.
" icelus, Lintner.
" lucillius, Lint.

Eudamus, Swainson.

Eudamus bathyllus, S. & Abb.
" lycidas, S. & Abb.
" tityrus, Fab.

HETEROCERA, B.

Hemaris, Palm.

Hemaris tenuis, Grote.

Haemorrhagia, Gr. & R.

Haemorrhagia gracilis, Gr. & R.

Haemorrhagia uniformis, Gr. & R.
" thysbe, Fab.
" tenuis.
" Buffaloensis.

Amphion, Hüb.

Amphion nessus, Cram.

SPHINGIDÆ.

Thyreus Abbotii, Swain.

Deilephila chamoenerii, Harris.
" lineata, Fab.

Darapsa choerilus, Cram.
" myron, Cram.

Sphinx drupiferarum, Sm. & Abb.
" Kalmiae, Sm. & Abb.
" gordius, Hüb.
" luscitiosa, Clem.

Ellema Harrisii, Clem.

SATURNINA, H. S.

Euchronia, Packard.

Euchronia maia, Drury.

Hyperchiria, Hüb.

Hyperchiria io, Fab.

Anisota, Hüb.

Anisota senatoria, Smith.
" stigma, Hüb.

ARCTIIDÆ, Stephens.

Spilosoma, Stephens.

Spilosoma isabella, Smith.
" virginica, Fab.
" latipennis, Stretch.

Euchaetes, Harris.

Euchaetes oregonensis, Stretch.
" collaris, Fitch.

THYRIDIDES, H. Sch.

Thyris, Ochsh.

Thyris lugubris, B.

Aegeria.

Aegeria pictipes. Gr. & R.

ZYGAENIDES, Latr.

Ctenucha, Kirby.

Ctenucha virginica, Carpenter.

Scepsis, Walker.

Scepsis fulvicollis, Hüb.

Lycomorpha, Harris.

Lycomorpha pholus, Drury.

Harrissina, Packard.

Harrissina procris, Harris.

COCHLEOPODA, B.

Cyrtosia, Packard.

Cyrtosia albipuncta, Packard.

Limacodes, Latr.

Limacodes scapha, Harris.

Lagoa, Harris.

Lagoa crispata, Packard.

PSYCHIDÆ, B.

Peraphora, Harris.

Peraphora Melsheimerii, Hüb.

PLATYPTERYCIDÆ, Stephens.

Dryopteris, Grote.

Dryopteris, rosea, Grote.

Drepana, Schrank.

Drepana arcuata, Walk.

NOTODONTIDÆ, Stephens.

Hypurpax, Hüb.

Hypurpax aurora, Sm. & Abb.

The following Lepidoptera are extremely local in their distribution, and are found at Center, but not, I believe, elsewhere in New York.

Lyc. Scudderi.
Hes. metea.
" vialis.
" delaware.
" hianna.
Thecla augustus.
Mel. Harrisii.
Thyris lugubris.
Euch. oregonensis.
Neonympha canthus.
Haem. gracilis.

CORRESPONDENCE.

NOTES ON THE FOOD PLANT OF HEMILEUCA MAIA.

Last season I reared a brood of this rare species from eggs sent me by my worthy friend, Wm. Provis, of Detroit. The locality where he found the eggs is in Oakland County, Mich., known as the 5,000 acre tract, and so low and marshy that it is covered with water part of the year. In his interesting letter, giving a description of the place, he says: "The timber is mostly swamp oak and willow, and the land so low and wet I found great difficulty in getting about." Mr. P. was too late to find any of the larvae, they having finished their growth and entered the ground, but the imagines were very plentiful, flying about in a very lazy manner, and occasionally dropping down in such a way as to induce one to think they had been injured..

Many of the females were depositing their eggs—not, as my friend had expected, on the oak—but on a species of wild aster found in abundance in the locality. The oak and aster are, botanically speaking, widely separated, and yet the female, whose instinct ought to teach her what course to pursue for the welfare of her offspring, is found depositing her eggs on the latter as well as the former, which goes to show that the food plants of this species have a far wider range than had been previously supposed. To convince me he was correct, Mr. Provis sent me a stem of the aster with a cluster of eggs in the form of a ring glued to it.

—— ROBERT BUNKER.

Camp at "Lake Forest," Erie Co., N. Y., June 8, 1877.

Entomology can be pursued with great success when camping out. Here, on the borders of Lake Erie, our camp is pitched on the top of a

sandy ridge, which is covered with hemlock, beech and chestnut trees, and was formerly, no doubt, a reef when the lake was more extended. An outer sand ridge, parallel with ours, runs along the beach and up the lake, while between the two a small creek finds its way into the larger waters. Last night, at "sugar," about the camp, I took specimens of *Habrosyne scripta*, *Acronycta noctivaga*, *Charandra deridens*, *Pyrrhia exprimens*, *Zale horrida* and *Homoptera duplicata*. I think *Zale* may be distinguished by its brown, discolorous and exaggerated thoracic tufts. I was much pleased to see many *Sphinges* come to the bait. I took *Thyreus Abbotii*, *Ellibia versicolor*, *Everyx choerilus* and *Sphinx Kalmiæ*. The flight of *versicolor* is more like that of *Kalmiæ* than *choerilus;* the latter sits close to the bait, the tongue being apparently shorter than in *versicolor*. The specimen of the latter which I captured (I saw a second) is fresh, and in looking at it one is reminded of the saying of Marcus Aurelius: "That which is beautiful is beautiful in itself; the praise of man adds nothing to its quality." The *Sphinges* came to the bait till 9 : 30 o'clock—it being very dark and cloudy; *Kalmiæ* was the earliest to appear. The species of *Lithophane* and *Scopelosoma* are now apparently over. *Heliophila Harveyi* and *phragmitidicola* are common at sugar, as well as *Hadena finitima*, and *Eustrotia apicosa* and *carneola*. A. R. GROTE.

Coalburgh, W. Va., 15th May, 1877.

In my recent Catalogue I named a genus of Hesperia on behalf of Mr. Butler, and called it *Lintneria*. It so happens that Mr. Butler had given this name to one of the genera of the Sphingidæ in his late "Revision" of that family, a fact which I only discovered a few weeks ago, and after the Catalogue was published. Mr. Butler proposes the name *Systasea* for the genus of Hesperidæ spoken of, which therefore should stand *Systasea* Butl. W. H. EDWARDS.

EFFECT OF HOT WEATHER UPON THE TRANSFORMATION OF THE SPHINXES.

The 28th of last July I found feeding on the Virginia Creeper two larvae of the Satellite Sphinx *(Philampelus satellitia)*. One was nearly full grown, and at the end of three days stopped feeding and entered the ground. August 1st passed through its transformations, and came out the 10th of September. It proved to be a very fine female of large size, with colors unusually bright. The above would seem to show that this species in a warm climate would become double brooded.

ROBERT BUNKER, Rochester, N. Y.

The Canadian Entomologist.

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REMARKS UPON THE CYNIPIDÆ.

BY H. F. BASSETT, WATERBURY, CONN.

In an article published in the ENTOMOLOGIST for May, 1873, I gave the results of my observations upon the genus *Cynips*, so far as they related to the agamous reproduction of certain species.

I showed that at least two two-gendered species, *C. q. operator* O. S. and a species nearly related to, if not identical with, *C. q. batatus* Bassett, were followed in the next generation by a brood composed entirely of females.

I had reared thousands of *C. q. batatus* of both generations, not for one, but for a series of years, and always with the same results. The early summer brood from leaf galls was always made up of both sexes in nearly equal numbers. The brood from the late summer galls came out in the spring (from twig galls), just as the leaves began to appear, and were all females.

In the case of *C. q. operator* there could be really no room for doubt, as this very peculiar species was repeated, except in size, in the females I took in the act of ovipositing.

If there could be any doubt, it was certainly dispelled when Prof. C. V. Riley reared from the acorn cup galls produced by *C. q. operator*, gall flies exactly like those I had found ovipositing in the buds of the shrub oak.

I advanced the idea in that article that when the true history of the one-gendered species should be known, they would be found to alternate with a generation of males and females. Further proof of this than I now offer will hardly be called for.

Dr. Gustav Mayr, of Vienna, in a letter just received, states that Dr. Adler, of Schleswig, has this year published an "epoch-marking" paper upon the subject of agamous reproduction among the Cynipidæ.*

Dr. Adler finds that what have been described as fourteen distinct species of Cynipidæ—belonging to six distinct genera—are really but seven species.

Four species of *Neuroterus* are found to be the agamous forms of as many species of *Spathegaster*.

Two species of *Aphilothrix* are the agamous forms of two species of *Andricus*, and a species of *Dryophanta* is the agamous form of a *Trigonaspis*.

Dr. Mayr himself was at work upon this problem, but had not succeeded, as his efforts to grow oak trees in his garden had failed. He had not given up the attempt, but had ordered more trees to plant this spring.

Neither Dr. Mayr nor Dr. Adler seem to have seen my article. I communicated the substance of it in a letter to Prof. Albert Müller, then in London. This was read before the London Entomological Society at the meeting of April 7th, 1873, but I notice that English Entomologists continue to talk about Hartig's experiments, and agamous reproduction through an infinity of generations, and of a hypothetical male gall fly that must appear now and then, always just in time to save the race from extinction.

Dr. Adler's paper will no doubt receive the attention it justly deserves and it is to be hoped that the success that has followed his experiments may lead others to aid in developing the history of this singular family of insects.

It is not safe to assume that the history of one species will be the history of all, but the idea that these insects are perpetuated through many generations by unimpregnated females must be abandoned.

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* Since the above was written I have received a copy of Dr. Adler's paper; also a letter in which he kindly consents to the publication of all or a part of the paper. I propose shortly to prepare for publication in the ENTOMOLOGIST a summary of his remarkable discoveries.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

GRACILARIA.

G. (Corisceum) albanotella Cham.

The nearest known ally of this species is the European *C. Brongniardellum*, not *C. caliciella* St., as I suggested before I knew *Brongniardellum*. *Albanotella* makes a large, somewhat tentiform mine, on the under surface of oak leaves (*Q. obtusiloba* and *Q. alba*); the mine is at first long, winding and *Nepticuli*-form, ending in the large tentiform blotch. The larva, before leaving the mine, becomes pinkish red. In the breeding cage it pupates in a cocoonet which it spins on the surface of the leaves. I have never met with the pupa elsewhere, nor have I ever, although I have seen hundreds of the mines, found one on the upper surface of the leaf. Yet in Colorado I found a precisely similar larva in precisely similar mines, always on the upper surface of the leaves, and the cocoonet of the pupa was always found on the leaves near it. The larva of *albanotella* is abundant in the latter part of May and the first half of June, and I have never seen it at any other time, though from the abundance of the imago in perfect condition in May, I infer there must be a fall brood of the larva. The description should be corrected to state that the ciliæ of the fore wings are whitish with the tips at the apex fuscous, and with a wide yellowish hinder marginal line, which sends off two ciliary lines or hooks through the dorso-apical ciliae. The eyes are bright red.

G. fasciella Cham.

Aesyle fasciella Cham., C. Q. J. S., v. 2, p. 97.

In indicating the new genus *Aesyle* for this species, I committed a mistake very similar to that of Dr. Clemens in establishing his genus *Parectopa* for *P. robiniella*, &c., which also belong in *Gracilaria*. *G. fasciella* finds its nearest ally in the European *omissella*, but the fasciae are oblique and angulated in the latter, and are not in *fasciella*, in which they are perpendicular to the margins: *fasciella* has four white fascia separating the five grayish ochreous ones, the last of which covers the apex, which is

white in *omissella*. The position of *fasciella* in repose is that of a *Gracilaria*, but it has not the slender, graceful appearance of such species as *superbifrontella*, *Packardella*, etc., and the shorter, more robust palpi and antennae and somewhat different neuration indicate affinities with *Lithocolletis*. The second joint of the palpi, though not tufted, is somewhat thickened beneath with scales.

G. (Corisceum) quinquenotella, n. sp.

Very different from *C. quinquestrigella* Cham. ; nearer to *C. albanotella*, but, notwithstanding the small though distinct tuft on the second joint of the palpi, which places it in *Corisceum*, it finds its nearest congener both structurally and in ornamentation in the preceding species, *G. fasciella*.

Pure snowy white ; outer surface of the second joint of the palpi grayish brown ; eyes bright red ; antennae whitish, annulate with fuscous ; thorax with two small brownish specks just before the apex. The marks on the fore wings are grayish fuscous tinged with ochreous, and are placed as follows : there is a basal costal spot extending about one-fifth of the wing length, *sometimes* followed by a small spot about the basal third of the costa ; there is a somewhat oblique streak extending to the fold, and which *sometimes* sends a branch from about the middle of the wing to the costa, thus enclosing a small white costal spot ; then follows a fascia, wide on the costa, where it *sometimes* encloses a small white spot ; at about the end of the cell this fascia curves obliquely back to the anal angle ; it is followed before the apex by another somewhat oblique fascia, and there is still another on the apex ; *sometimes*, however, the apex is yellowish with a small apical brownish spot, followed by a curved hinder marginal line ; the fascia next before the apex is continuous in the dorsal ciliae with a faint dark hinder marginal line, and the fascia *at* the apex is continuous with another similar line ; or both of these lines may be considered as a single interrupted line. Where I have indicated above that the marking is *sometimes* present, it is sometimes present in one wing and absent in the other of the same specimen. Abdomen fuscous, with the hinder half of each segment on the ventral surface white and anal tuft yellow. Legs and tarsi annulate with brown and white. *Al. ex.* 4 lines. Kentucky, June 10th to 15th.

G. 12-linecella Cham.

This specific name may be misleading, and, indeed, I can not say that

I am certain that there are just twelve white or black marginal markings on the fore wings; these color marks are so narrow, some of them so short and sometimes so faint, that it is well nigh impossible to describe the species with anything like accuracy. The most distinct and salient mark is the oblique dark gray or gray brown streak on each side of each segment of the whitish or pale gray ventral surface of the abdomen. Indeed, owing to the indistinct and confused character of the markings on the fore wings, I have sometimes doubted whether I have not two very closely related species before me. I think, however, there is but one, but any, even the least denudation—such, even, as is almost inevitable in pinning and setting a specimen, even where the denudation is so little that it requires comparison with other specimens to detect it—alters the character of the markings so that a description could scarcely be prepared from one specimen by which another could be recognized. The original description was prepared several years ago from three specimens, and I have never seen another until this year (May, 1877), when I have taken two others.

The wings are very narrow, but the general color and the style of ornamentation are much nearer to those of many species of *Ornix* than to any species of *Gracilaria* known to me. It is, however, a true *Gracilaria*, belonging to the same section (as I think) with our *salicifoliella* and the European *Kallasiella*. In perfectly fresh specimens three or four distinct white dorsal streaks are found before the middle of the wing length, one of which is much larger and more curved than the others, and is placed a little before the middle, and there is another and very similar one about the anal angle. There are some five or six tolerably distinct blackish costal streaks, most of them in the apical half of the wing, and very close to each other; they are the dark margins of as many white streaks, which, however, are, some of them (sometimes all of them save one or two), very indistinct. One of these white costal streaks in the apical part of the wing meets at an acute angle the distinct curved white dorsal streak of the anal angle above mentioned, and just behind it an oblique, narrow, much curved white fascia crosses the wing to the anal angle, where it is continuous with the whitish or pale gray hinder marginal line, which crosses the middle portion of the dark gray ciliæ (or the ciliæ may be described as pale gray, with two wide dark gray hinder marginal lines, one at their base, the other at their tips). But the least denudation removes portions of these white and blackish markings, so that they pre-

sent a very different appearance. Perhaps as good a description as could be given would be to say that it is gray mottled more or less distinctly with white and dark gray marginal streaks on the fore wings, the apex of which is dark gray or gray brown.

G. purpuriella Chamb.

This is the nearest known American representative of the European *G. stigmatella*. It differs from that species as described and figured in Nat. Hist. Tin., v. 8, by having the head and palpi brownish red with a purplish gloss, rather than "reddish gray," and the antennæ purplish brown with very faint white annulations, rather than "pale yellowish with brown annulations." The anterior wings might, perhaps, be called reddish brown, but are very strongly suffused with rich purple; the triangle is white instead of yellowish white, and its margins are not darker than other parts of the wing. As in *stigmatella*, the triangle is sometimes produced beyond the fold. The ciliæ in *stigmatella* are described as "rufous, towards the anal angle gray." In *purpuriella* they do not differ from the general color otherwise than that they have less of the purple hue. The statement in the original description that there is a wide white band across the middle of the posterior femora must have been made under an impression produced by a reflection of the light, or by slight denudation, though the statement that the tip is white is correct, and the base is also white. In *stigmatella* the posterior tibiæ are "pale reddish gray"; in *purpuriella* they are sordid whitish (or white suffused with pale reddish brown); instead of "pale grayish fuscous," as in my original description, the posterior tarsi may perhaps be better described as dark brownish gray, and the other tarsi are of the same hue, whilst in *stigmatella* all the tarsi are described as "whitish faintly spotted with pale gray." My specimens range from a little over six to full seven lines *al. ex.*; *stigmatella* is seven lines. It makes the most perfect "cone" of all the species known to me, frequently using up the entire leaf. I have never found it on any willow except *S. longifolia*. The small spots in the triangle vary in number and size. The most striking difference on comparing a specimen of *purpuriella* with the figure of *stigmatella*, is in the ciliæ of the fore wings, which in *stigmatella* are much paler, more yellowish, while in *purpuriella* they are so dark as to make it somewhat difficult to detect the three hinder marginal lines.

G. erigeronella.

G. plantaginisella Cham.

In one of the vols. of the Zoo. Rec. the Recorder has expressed some surprise at my having changed the name of a species first described by me because I had discovered its food plant. Nevertheless, the practice is so general, and, in my opinion, it is in every way so convenient and proper, to give to the *Tineina* specific names derived from the food plants of the larvæ, that I can not but think it best to adhere to it rather than to an arbitrary rule of priority, especially where the name first given has probably never been used except by the person who bestowed it, and where the change is made by that person, and the first name is not only inappropriate, but misleading, as it would be in this instance. It is not necessary to explain how I was led into the error of supposing that this species feeds on *Plantago* instead of *Erigeron*.

There is a *Gracilaria* larva which, when very young, makes a small mine in the upper surface of the leaves of the Hop hornbeam (*Ostrya Virginica*), but I have never been able to have its subsequent history. Like some other larvæ of this genus, when *very* young, it shows some resemblance to the flat group of larvae of the genus *Lithocolletis*.

NOTES ON LARVÆ—FONDNESS FOR WATER—HINTS TO BEGINNERS.

BY C. G. SIEWERS, NEWPORT, KY.

Last spring, while collecting beetles under the bark of decayed logs, I met with numbers of the larvæ of *Arctia isabella* (hairs brown in the middle, black at each end of larva,) about to spin up. Not knowing their hybernating habits, they had always baffled me, and under the impression that they would require another season to mature, had been turned loose. I collected some twenty, put them into a box with cotton and paper scrap, and they at once spun up, all but four. These wandered up and down for a week, having some want, and wasting away. It

struck me they might want water. Wetting a sable, I proffered a drink. They all drank greedily, grasping the brush with their fore-legs, and even following it around. I watered them two or three days, but tired of this and threw them out. The same day they were found spinning up on the fence. This spring I collected another lot, and gave them some curved bark to spin in. About one half refused to spin. I soused them with water. Two remained contumacious, but another wetting brought them to terms. The black larva of the Great Leopard Moth, *Ecpantheria*, hybernates also, spins up about the first of June, and emerges about the 15th with us. Feeds on Poke-berry plant, and will eat cabbage. I failed to winter some twenty this season. Either they dry up in the house, or mould in the cellar. They should be wintered out-doors, in a box without bottom placed on the ground and half filled with leaves and brush, exposed to the weather, but having proper drainage. They come out of the leaves in the spring distended by moisture. Whether they feed before spinning is uncertain. I collect them in the fall at the foot of willow trees, when digging up the pupa of *Smyrinthus geminatus*.

It is generally claimed that moist leaves will induce scouring in the *Bombix mori*, but out-door larvæ get abundance of rain and dew, and may require it. In confinement they fail to get their full growth. Their food should be sprinkled daily. The great difficulty of keeping the food fresh deters many from rearing larvæ. To such I would say, try tin boxes or glass jars. Clean daily and keep moist. Two or three drops of water are sufficient. I have had a lot of empty fruit cans capped, and have kept food fresh in them for ten days. When the nearest food plant is three miles distant this is some object. I find that they do not require light, and but little air. When they cease feeding, remove to spinning or ground boxes. The ground must be kept moist, or the larva will be unable to remove the skin around the thorax, and strangle. If they find t too dry they will come out and try to escape. Many wander about for a day or two before burying themselves. Covering the ground with sod often expedites matters. When ten days have passed they may be sifted out to give place for others, and laid out in another ground box on top, as it is preferable to have them in sight, on account of vermin. Never pull larvae from their food, especially when moulting in changing food. Clip the old food off around them, and they will change themselves. Placing some hungry *Apatura clytons* three inches from fresh food, they struck a bee line for it.

Raising larvæ is by far the most instructive feature of Entomology, and very interesting. Entirely too little attention is paid to it. We want the whole life. How utterly ignorant we are, for instance, about the larvæ of *Catocala*! Let all faulty females be confined, and they may lay impregnated eggs; try the young on willow, walnut or oak leaves. The female is known by the heavy body tapering to a point; the male terminates in a pair of claspers. Some species are readily determined by their antennæ, the males being more broadly pectinated than the females.

The larvæ of wood-boring beetles can be raised in tin or glass on wet saw-dust (not pine); any mixed hardwood or poplar will do. I have kept them so six and eight months, changing the saw-dust once a month. But they are very tiresome, as one may have to keep them a year or two.

ON A NEW SPECIES OF COSSUS.

BY J. A. LINTNER, N. Y. STATE MUSEUM NAT. HIST., ALBANY.

Five years ago, I discovered at Center, in the trunks of poplar trees (*Populus tremuloides*) several pupal cases of a *Cossus*, which, by their differing from the other cases known to me, of *C. Robiniæ* and *C. querciperda*, I had reason to believe was an undescribed species. This year, on the 14th of June, on examining some infested trees, several pupal cases were discovered projecting half-way from the trunks, and an imago, which had apparently just emerged, and was resting on the stump of a broken limb. The colors of the moth so exactly simulated the surface on which it rested that it was with difficulty observed, even when looking directly at it. The moth, in all probability, is an undescribed species, for, from the description given by Walker of a *Cossus* found at Hudson's Bay, and named by him *C. populi*, it must differ from that species.

In recognition of the very large number of rare Lepidoptera which the Center locality has yielded and still continues to give to persistent exploration, I propose for it the name of *Cossus Centerensis*.

The female, in its appearance, approaches nearer *C. querciperda* than any other of our species. The collar and thorax are black, edged with grey scales. The abdomen is black above, interspersed with grey scales toward its tip, and more thickly beneath. The primaries are black over rather more than their inner half, with some grey scales a little within the centre of the wing; the centre portion of the wing beyond the reniform is greyish. The wing is traversed by broken, black, transverse lines, of which twenty or more can be counted on the costal margin; three or four of those on the outer portion are more continuous and conspicuous than the others. The fringe is marked with black scales opposite the veins. The secondaries are nearly transparent, darker along their inner margin, showing some faint reticulations, which are more conspicuous beneath.

The male strongly resembles the female, instead of presenting the marked contrasting differences found in *C. robiniæ* and *C. querciperda*. Its wings are only a little more projected apically than in the other sex.

Expanse of wings of the pair in my collection, ♂ 2 inches; ♀ 2.5 inches. Length of body, ♀ .95 inch.; ♂ 1.20 inch.

Subsequently to the capture of the above, several additional examples have been taken in the same locality. On the 18th June four specimens were collected by Mr. Meske.

NOTICE OF MR. BUTLER'S REVISION OF THE SPHINGIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The object of this notice is to call the attention of American Entomologists to a most excellent and complete "Revision of the Family Sphingidæ," by Arthur G. Butler, of the British Museum, which has appeared in the Transactions of the Zoological Society, London, in quarto form. A proper arrangement of the Sphingidæ of the world is a work requiring both extensive material and great experience and tact, of which

Mr. Butler has shown himself to be equally possessed. It is not my intention at this time to discuss minor points (such as Mr. Butler's citation of *Philampelus satellitia* Harris to Linné's species of that name instead of to *pandorus*, where it belongs), or the larger questions as to the number of groups, Mr. Butler separating the *Ambulicinæ* from the *Chærocampinæ*, while Grote and Robinson in 1865 left them united. The arrangement, indeed, is virtually that of our synonymical catalogue of 1865; the genus *Acherontia*, not represented in America and left out of consideration by ourselves, is made into a separate sub-family *Acherontiinæ* by Mr. Butler. I wish merely to note here the changes which I am at present willing to admit in the arrangement proposed in the "Check List of North American Sphinges" published by myself in 1875.

Haemorrhagia G. & R.

I do not admit that *Buffaloensis* and *uniformis* are identical. The former is smaller sized and there is a slight toothing or unevenness of the inner margin of the terminal band of the primaries. The discal cell is reduced and the transverse scale line tends to be absorbed by the scales clothing the median vein. Nor do I admit that Kirby's *ruficaudis* is the same as *uniformis*; I have shown that Kirby's description boldly contradicts it. There is some warrant for believing that Kirby intended *diffinis* or a species of *Hemaris*, as I have shown, CAN. ENT., 6, 170. Mr. Butler's *ruficaudis* is probably *uniformis*. The Albany collectors take both *Buffaloensis* and *uniformis* (Mr. Lintner has reared *Buffaloensis*), and we may look for further careful and consequently decisive information from them in regard to these points. Although Mr. Butler speaks adversely, and perhaps a little vexatiously, on p. 518, as to the validity of the genus, on p. 521 he says of *Haemorrhagia*: "This may, perhaps, be a genus, the species being more densely scaled than in *Hemaris*, and having consequently a somewhat different aspect: on the whole, however, I prefer to regard it for the present as a section." The reason, if I remember rightly, that we were not certain of the generic position of *radians* was that we did not know the species, nor have I seen it since 1865.

Callenyo Grote.

This term should be employed, I think, for *carinata* as distinguished by Mr. Butler from *Aleuron* (*chloroptera*, etc.).

Everyx Boisd.

Having in 1865 restricted Walker's term *Darapsa* to *rhodocera*, I should not again have used it for this genus. I abandoned my restitution of Hübner's term *Otus* for this genus because the term is preoccupied in ornithology. Boisduval's term must stand for the species, which are apparently four in number, *syriacus* from Asia, and *chœrilus*, *myron* and *pholus* (W. J.) from America.

Elibia Walk.

To this genus Mr. Butler refers *Chaerocampa versicolor* of Harris.

Smerinthinæ.

The genera proposed by myself are for the most part adopted. I am not now prepared to accept the extension of *Calasymbolus*. The following change seems to be proper:

Triptogon Brem.

To this genus should be referred the *Smerinthus modesta* of Harris.

[Since writing the above, Mr. Butler has kindly replied to my note to him conveying the substance of the foregoing remarks as to *C. astylus*. I feel authorized to take *S. geminatus* as a new generic or sub-generic type under the name *Eusmerinthus*, differing from *ocellatus* of Europe and *ophthalmicus* of California in the shorter subcostal nervules of fore wings, the angulated external margin, while the median vein runs close to the subcostal for one-third its length; while the median branches are shorter, the wing may be seen to be markedly distinct in form. In the hind wings the apices are more rounded and the outline differs by the indentation before anal angle. The antennae are comparatively shorter. I am indebted to Mr. Butler for sketches and notes defining this group, in which I would include *cerisii*, *coecus* and *Kindermanni*.]

Sphinginæ.

Isognathus Feld.

Mr. Butler omits to note that I adopted this genus for *rimosa* and *congratulans*, Tr. Am. Ent. Soc., 185. I am not now in possession of any of my material of the species of *Dilophonota*. I think that Mr. Butler has been rash in his conclusions, in view of the fact that he had no material from Cuba before him. Boisduval adopts my identification of

cenetrus, and, on the whole, I am decidedly of opinion that Mr. Butler has again brought confusion into the difficult group by his synonymy, which is at variance with that given by Dr. Boisduval and myself.

Protoparce Burm.

As having priority over *Macrosila* Walk., Mr. Butler refers our species to this genus of Burmeister's. Boisduval claims the term *Macrosila* for *tetrio*, but for this species *Pseudosphinx* has priority.

LIST OF CANADIAN DIPTERA.

BY WM. COUPER, MONTREAL, P. Q.

The following list of Canadian Diptera has been compiled from British Museum catalogues for 1848 and '49. The greater number of the species were described by the late Francis Walker. Those from Hudson's Bay were collected by Geo. Barnston, Esq., of Montreal, when residing at St. Martin's Falls, Albany River. The material from Nova Scotia was presented by Lieut. Redman to the British Museum. I have not included the species collected by Mr. Doubleday in the United States, nor those recorded as coming from North America. A few species from Newfoundland and New York Factory are also omitted.

FAM. I. TIPULARIÆ.

Sec. I. Culiciformes.

Culex stimulans, Nova Scotia.
" impatiens, Hudson's Bay.
" punctor "
" impiger "
" implacabilis "
" provocans, Nova Scotia.
Chironomus bimacula, Hudson's B.
" confinis "
Chironomus nigritibia, Hudson's B.
" albistria "
" crassicollis "
" unicolor, Nova Scotia.
" lasiomerus, Huds'n's B.
" festivus "
" lasiopus "
" attenuatus "
" flavicingula "
" fimbriatus "
" trictiomerus "

Chironomus brunneus, Hudson's B.
" pellucidas "
Tanypus decedens "
Ceratopogon transiens "
" parvus "
" obscurus "
Asthenia americana "
Lasioptera parva "
Cecidomyia spongivora "
Psychoda degenera "
Pedicia albivitta, Nova Scotia.
" contermina "
Limnobia simulans, Hudson's Bay.
" badia, Nova Scotia.
" cana, Hudson's Bay.
Tipula triplex, Nova Scotia.
" duplex "
" borealis "
" maculipennis "
" frigida "
" dorsimacula "
" alterna "

Ptychoptera metallica, Hudson's B.
Hesperinus brevifrons "
Bittacomorpha clavipes, N. S.
Anisomera longicornes, Hudson's B.
Chionea aspera "
Trichocera bimacula, Nova Scotia.
Asindulum tennipes, Hudson's Bay.
Diomonus nebulosus "
Sciophila rufilatera "
Leja unicolor "
" varia "
" trifaciata "
Mycetophila bifasciata "
" propinqua, Nova Scotia
" contigua "
" lata "
Mycetophila parva, Hudson's Bay.
" plebeja "
" obscura "
" despecta "
Sciara exigua "
" robusta "
" atrata "
" perpusilla "
" polita "
" abbreviata "
Simulium decorum "
" invenustum "
Scatopse nitens "
" obscura "
" pusilla "
Arthria analis "
Penthetria atra "
Dilophus serraticollis "
" fulvicoxa "
Bibio humeralis, Nova Scotia.
" scita "
" vestita "
" fumipennis, Hudson's Bay.
" striatipes "
" gracilis, Nova Scotia.

Fam. II. Xylophagi.

Beris quadridentata, Hudson's Bay.
Xylophagus fasciata "

Fam. III. Tabanii.

Tabanus calens, Nova Scotia.
" Tarandi, Hudson's Bay.
" flavipes, Nova Scotia.
" affinis, Hudson's Bay.
" zonalis "
" melanocerus "

Tabanus vicinus, Hudson's Bay.
" inscitus "
" frontalis, Nova Scotia.
" intermedius, Hudson's B.
" imitans "
" gracilis, Nova Scotia.
" marginalis "
" simulans "
Chrysops vittatus "
" furcatus, Hudson's Bay.
" moereus, Nova Scotia.
" sepulchralis, Hudson's B.
" carbonarius, Nova Scotia.

FAM. IV. LEPTIDES.

Rhagio intermedius, Hudson's Bay.
" mystacea, Nova Scotia.
Leptis proxima "
" reflexa "
" quadrata "
" fumipennis "
Atherix variegata, Hudson's Bay.

FAM. V. XYLOTOMÆ.

Thereua vicina, Nova Scotia.
Thereua conspicua, Nova Scotia.
" senex "

SUB-ORDER—PROBOSCIDEÆ.

FAM. VII. BOMBYLIARII.

Anthrax oedipus, Nova Scotia.
" fascipennis "
" analis "
" vestita "
" fulviana "
" bastardi "
" lateralis "
Bombylius pygmaeus, Hudson's B.
" major "
Dasypogan sexfasciata, Nova Scotia.
" argenteus "
" falto "
" lutatius "
Laphria Æatus, Hudson's Bay.
" posticata, Nova Scotia.
" thoracica "
" sericea "
" sacrator "
Asilus lecythus "
" apicalis "

A NEW PLUSIA ALLIED TO HOCHENWARTHI.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

M. C. R. v. Osten Sacken has been kind enough to send me a few Noctuidae collected by himself in Colorado and the West. Among them

is a new *Plusia*, allied to *alticola* and the yellow-winged European species, which I dedicate to its discoverer under the name of *Plusia Sackenii*. It is larger than its allies, and to be at once distinguished by the transverse posterior line being inwardly bent opposite the cell. Fore wings dark gray, with the median space below the median vein rich brown, reminding us of *ampla*. Interior line golden, arcuate, interrupted on cell, inaugurated on costa by an interior golden patch. Cell shaded with light pinkish gray. Reniform moderate, upright, apparently open to costa, with fine golden annulet, preceded by a dusky costal shade. Metallic mark smaller than in allied forms, and open or v-shaped outwardly. Beyond it an elongate pale golden spot separate. These metallic marks are set in a richer brown. Transverse posterior line geminate, concave, slightly trembled superiorly, below median vein (or rather vein 3) with a fine golden interior line and edged by reddish brown on median space, while there is a spot of same color outside the line at its rounded termination near internal angle. Subterminal line indicated by difference in shade color, dentate. Hind wings light yellow above and below, with a moderate black marginal band. Costa beneath somewhat brownish, and a small discal dot is apparent; above the base is dusky and there is a faint and narrow lunule.

This species was taken at Idaho Springs, Colorado, on Aug. 15th; the specimen bears the number "2." It differs strongly by the ornamentation of the primaries from any known species of the yellow-winged group. The internal margin of primaries is more sinuate and the habitus is rather that of *ampla* and allied forms with dusky secondaries. The new species expands 34 mil.

I avail myself of this opportunity to correct two errors in certain of my previous communications. On page 89 of this volume I should have given Prof. Lintner and not Mr. Hill the credit for the observation on *edusa* and *lunata*. We owe very much to the patient investigations of Prof. Lintner with regard to our moths, and I need no excuse to praise his carefulness nor the superb condition of the Albany collections under his charge.

On page 106 a correction must be made: for *vautalis*, read *rantalis*.

BOOK NOTICES.

Economic Entomology, by Andrew Murray, F. L. S., London, England. Aptera, 8vo., pp. 433, profusely illustrated with wood-cuts.

This useful volume is the first of a series of hand-books which are intended to serve as guides to the different departments of the collection of Economic Entomology in process of formation at the Bethnal Green branch of the South Kensington Museum, and also as practical treatises for the use of the public generally. In order the better to serve its primary purpose of guide to the collection, the contents of the several cases are described in this volume in the order in which they present themselves to the visitor, containing in some instances other specimens than insects. The work opens with a short chapter on Crustaceans likely to be mistaken for insects; for example, species of *Oniscus*, *Porcellio* and *Armadillo*. Next in order are the Myriapods—Julidæ and Scolopendridae; then Scorpions and their allies; Spiders, Mites, Lice, Thysanura (Spring-tails) and Lepismidae. Three new genera and thirteen new species are described in this volume.

The descriptions are briefly and plainly written, and the habits and life history of the species are delineated in a pleasing and popular manner. The work is well printed in good, clear type, and most of the illustrations are excellent. Already we have found it very useful, giving in a condensed form a vast amount of information not otherwise readily obtainable. We heartily commend this work to our readers, and trust that the talented author may be spared to complete the series proposed, which will appear in the following order: 2nd vol., Bugs; 3rd, Locusts, Grasshoppers, Cockroaches and Earwigs; 4th, Two-winged Flies; 5th, Bees, Wasps, &c.; 6th, the Dragon Flies and May Flies; 7th, Butterflies and Moths, and lastly, the Beetles.

Ninth Annual Report of the Noxious, Beneficial and other Insects of the State of Missouri. By Chas. V. Riley, State Entomologist, March, 1877; 8vo., pp. 129, with 33 illustrations.

We welcome the ninth of this series of valuable reports with much pleasure. The following are the subjects treated of in the order in which they appear: The Gooseberry Span Worm; the Imported Currant Worm; the Native Currant Worm; the Strawberry Worm; Abbott's White Pine

Worm ; LeConte's Pine Worm ; the Colorado Potato Beetle ; the Army Worm ; the Wheat-head Army Worm ; the Rocky Mountain Locust ; the Hellgrammite Fly, and the Yucca Borer. The bulk of the report, sixty-seven pages in all, is occupied with details in reference to that terrible scourge of the West, the Rocky Mountain Locust, *Caloptenus spretus*, the other and less important subjects being much more briefly treated of. These reports contain an immense fund of valuable information, and have done much to popularize Entomology in America.

Harpalus caliginosus from Nature, by Franklin C. Hill ; two plates. We are indebted to Mr. Franklin C. Hill, of Princeton College, N. J., for copies of these excellent plates, recently published. They are beautifully finished and conveniently mounted on cards, 5 x 8, with all the organs and divisions both of the under and upper surface, distinctly named They will prove a valuable help to beginners, and indeed to all who are not already familiar with the names of the different portions of the body of Coleopterous insects.

CORRESPONDENCE.

AN INSTANCE OF RETARDED DEVELOPMENT.

On the 24th of September, 1875, I took a great many large caterpillars of a reddish buff color, with a dark dorsal stripe, feeding on willow. They soon went down to the soil and spun themselves up in hard brown cocoons, when I put them away for the winter. In the spring of 1876 I brought them to the heat, and after waiting some time and nothing appearing, I opened one of them and found the caterpillar alive and as fresh in color as when it first spun up. In this condition they continued until the fall, when I again put them away for the winter. In the spring of 1877 I again examined them, and found them fresh and with signs of life, but as the season advanced I opened some and found them dead, and the remainder having assumed a shrivelled look, I laid them aside as hopeless. On the 17th of June my attention was attracted by a scratching noise, which I found came from these cocoons, which were now reduced

in number to six. On lifting, I found one of them rattling and shaking with great vigor; I returned it to the box and waited three days, when nothing appearing, I broke it open and a fully developed fly walked out in a very feeble condition. Its length was 1 inch, expanse 1¾ inches Head, thorax and legs black, antennæ and feet yellow; abdomen brown: a yellow spot between thorax and abdomen; wings light smoky brown.

J. A. MOFFAT.

Hamilton, June 26th, 1877.

MELITAEA PHAETON.

I have caught this summer over fifty specimens of *Melitaea phaeton*: they have been extremely common here. I saw a gentleman recently from Ottawa who told me that he could have caught them by the hundred in that neighborhood, they were so very abundant.

GEO. W. PEARSON, JR., Montreal.

HOW TO DESTROY CABINET PESTS.

There is nothing more annoying to the experienced, or more discouraging to the young collector, than to have his specimens destroyed by mites, by the *Anthrenus*, or by the larva of *Dermestes*. Against the ravages of these enemies there is no security. Paste and paper fail to exclude them: camphor is only a partial protector, and the only safeguard of our cabinets is constant vigilance, and the instant destruction of the offenders when observed.

For this purpose many methods have been suggested—saturation with turpentine, immersion in alcohol or benzine, exposure to a heat of 210 degrees in a drying closet or oven, &c.; but most of these ways are apt to injure, or even destroy the specimens, while the last is often ineffective. Having, however, found a certain and rapid method of dealing with these intruders, I desire, through your pages, to make it known to my brother naturalists.

Some two years ago, I had a magnificent female *Platysamia (Saturnia) cecropia*, measuring 6⅞ inches across the wings when set out, which came out of a chrysalis in my breeding box. I succeeded in killing and stretching it without damage, and when dry, transferred it to my interim box, which hung against the wall. In about a fortnight I was annoyed to

see its antennæ cut off, the head and thorax denuded of most of their down, and some large holes made in the abdomen. After some consideration, I placed a gallipot, containing about 25 grains of cyanide of potassa roughly bruised, with a very little water, in the bottom of the case. I then introduced six drops of sulphuric acid, and let down the glass. In less than a minute I had the satisfaction of seeing a fine, stout *Dermestes* larva writhing in the death agony on the bottom of the box. Since that time I have tried the same several times, and always with the same success. It is equally applicable to the extermination of moths, &c., in stuffed birds and quadrupeds, as no animate being can inhale this gas and live. JAMES T. BELL, Belleville, Ont.

[NOTE.—Great caution would be necessary in using this remedy, not to inhale any of the highly poisonous gas which by the use of the ingredients named would be rapidly generated.—ED. C. E.]

In October, 1875, I found *Meloe angusticollis* Say in large numbers in our potato fields, but could not find any feeding on the vines. About 25 or more found their way into our gardens, and almost completely devoured a few plants of *Anemone japonica (Ranunculaceæ)*. We have a large collection of annual and perennial plants, but the *Meloes* could find nothing to suit their tastes but these *Anemones*. We had no *Ranunculus acris* on our grounds. Yours respectfully,

CHAS. D. ZIMMERMAN, Buffalo, N. Y.

LIMENITIS PROSERPINA.

Limenitis proserpina has been taken in this locality now and again, but rarely more than one in a season, and always in connection with *arthemis*.

J. A. MOFFAT, Hamilton, Ont.

CAPTURES AT SUGAR.

I have taken at sugar at Morristown, N. J., *Ellibia versicolor*, *Everyx choerilus* and *E. myron*. GEO. W. PECK, New York.

AGROTIS FENNICA WANTED.

I very much want four or six good specimens of *Agrotis fennica*. I believe the insect, though certainly not common, is by no means a rarity in some localities in Canada, but I am at a loss to whom to address myself. W. T. DOBREE, Hull, England.

The Canadian Entomologist.

VOL. IX. LONDON, ONT., AUGUST, 1877. No. 8

ON THE PREPARATORY STAGES OF SATYRUS NEPHELE.

BY W. H. EDWARDS, COALBURGH, W. VA.

I have tried for several years past to raise larvæ of *Satyrus nephele* to maturity, but met with no success till this last spring. It is very easy to obtain the eggs by confining the female with a tuft of grass. I tied a gauze bag on such a tuft set in a flower pot, while in the Catskills, and 21st August, 1876, obtained perhaps fifty eggs. Some were laid on the blades and stems of the grass, but many were dropped loose on the ground. The eggs hatched about the 21st of September, and the young larvæ without feeding entered upon their hybernation. I brought them to Coalburgh and transferred them to grass set in a pot. They were not so sound asleep but that they were able to attach themselves to the stems. The plant was placed in as cool a room as I could give it, and allowed to die, the larvæ remaining on the dried stems. On 29th Jan'y I found that about one-third of the larvæ were still alive, and I placed them on fresh grass in the green-house. These were feeding 1st February, as I could see by the bits cut from the edges of the leaves. The color of the newly hatched larvæ was carnation, marked by horizontal carmine lines, but very soon after beginning to feed they turned to pale green, and the stripes changed from red to a green darker than the ground. The appearance of the larva at this first stage is very singular, owing to the long curved bristles which arm the back and sides, giving a general resemblance to a fish bone. The 1st moult was passed 26th Feb'y and next following days. The 2nd on 21st March ; the 3rd, 3rd April ; the 4th, 18th April ; the first chrysalis formed 16th May, and the butterfly emerged 30th May. The stages were unusually long, but I find that characteristic of all species of *Satyridæ* that I have bred. And the larvæ are sluggish, moving very little and

slowly. In their general appearance after the first stage—in shape of body and head, and the form of the second segment—and in their habits, the larvae of some of the species resemble the larvae of *Hesperidæ* closely, and there is a marked likeness between some of the *Satyrid* and *Hesperid* chrysalids. The coloration in all the stages after hybernation in *nephele* is that of the grass the larva feeds on, or very nearly, and the larvae, although so slow in their motions, fall from the stems at the least alarm ; so that they are sufficiently protected in their natural state against most enemies. The resemblance between the larvae of *nephele* and *sosybius* is very close indeed. So between the chrysalids, while *gemma*, usually grouped with *sosybius*, has quite a different caterpillar and chrysalis. *Eurytris*, is much like *nephele*, except in color. I will soon give full descriptions of all these species in their early stages.

EGG OF NEPHELE—Conoidal, somewhat flattened at base, truncated at top, the sides rounded ; about 18 vertical ridges, with rounded excavations between, spring from the lower part of the side and run to the edge of the top ; this last is rounded, and covered with shallow cells, irregularly hexagonal around the outside, and in the middle long and narrow about an oval central cell. Duration of this stage 28 days.

YOUNG LARVA—Length one-tenth inch ; the anterior segments thickest ; on each side are three rows of long white bristles, one row being at the edge of dorsum, one on middle of the side, and one over the feet ; these spring from very prominent papillae, and the effect is to make the larva seem many sided ; the dorsal rows have one bristle on each of segments 2, 3, 4, but two on each of the others to last, and these are all curved back ; the second row has one to each segment and all are curved forward except on two last segments ; the lower row has two to each, and all are curved back ; color of body carnation ; there is a medio-dorsal crimson line, and three such lines close together on the side ; head large, one-half broader than 2, broader than high, sub-globose ; color light yellow-brown, specked with brown, and sparsely pilose ; on some examples there are cloudy brown patches over the upper part of the face. Larvae hybernate at this stage.

AFTER FIRST MOULT—Length 1¼ inch. ; cylindrical, thickest anteriorly ; the last segment terminating in two round, tapering and sharp appendages or tails, which are green, red at tips : these are not divergent from a common base, but each starts from the extreme side, and the interval between their bases is square ; color pale green, crossed longi-

tudinally by dark green stripes, one rather broad, medio-dorsal, and three close together on side; each segment creased several times, and on the ridges thus caused are white papillae, each sending out a blunt white hair; head nearly as before, a little broader than 2, somewhat broader in proportion to the height, light green, with white papillae in vertical rows, each with white hair. Duration of this stage 23 days.

AFTER SECOND MOULT—Length $\frac{30}{100}$ inch.; very much as before; whole surface one shade of yellow-green, except a dark dorsal stripe and a yellow ridge over the feet: head nearly as before. Duration of this stage 14 days.

AFTER THIRD MOULT—Length $\frac{44}{100}$ inch. Nearly as at last stage: the head sub-globose, higher and narrower than before, well rounded at top, and broadest below: color of head emerald green, and covered as before with conical papillae. Duration of this stage 14 days.

AFTER FOURTH MOULT—Length [illegible] inch.; greatest breadth $\frac{58}{100}$ inch. This stage continued 28 days before chrysalis.

MATURE LARVA—Length 1.20 inch.; greatest breadth $\frac{16}{100}$ inch. Cylindrical, thickest in middle segments, the back well rounded, and sloping equally to either extremity: ending in two sharp, conical tails, each placed at the extreme sides of the last segment; color dull yellow-green, the sides a shade darker than dorsum: a medio-dorsal dark green vascular stripe, and over the feet a yellow stripe or line; tails reddish; each segment creased about six times, and on the ridges so caused are many fine white papillæ, each sending out a fine white hair, rendering the whole surface pubescent: head sub-globose, a little larger than 2, frontally somewhat flattened, rounded at top, broader across the ocelli; color emerald green, the surface covered with slightly paler conical papillæ, pubescent.

CHRYSALIS—Length $\frac{6}{10}$ inch.; greatest breadth $\frac{2}{10}$ inch.; cylindrical, the abdomen evenly tapering; the wing cases a little raised at the margins; headcase short, roundly excavated at sides, and rounded at top; mesonotum slightly prominent, and followed by a small depression; roundly carinated, the sides nearly flat, or very little rounded; whole surface one shade of yellow green, covered with minute white granulations; along the inner margins of wing cases a cream white line, another along keel of mesonotum, and one across top of head case. Duration of this stage 14 days.

LIST OF ACRIDIDÆ FOUND IN NEBRASKA.

BY LAWRENCE BRUNER, WEST POINT, NEBRASKA.

Opomala carinata, Thos.
" aptera, Scudd.
" brachyptera, Scudd.
" bivittata, Serv.
" neo-mexicana, Thos.
" punctipennis, Serv.
" (?) varipes, Serv.; at Omaha two years ago.
Chrysochraon viridis, Thos.
" punctulatum, Thos.
" conspersum, Thos.
Stenobothrus admirabilis, Uhler.
" brunneus, Thos.
" aequalis, Scudd.
" propinquans, Scudd.
" curtipennis, Scudd.
" gracilis, Scudd.
" maculipennis, Scudd.
Gomphocerus clavatus, Thos.
" simplex, Scudd.
" euterpe, G. M. Dodge.
Stetheophyma gracilis, Thos.
Tragocephala viridifasciata, Harris.
" infuscata, Harris.
Tomonotus sulphurea, Sauss.
" xanthopterus, Thos.
" carinatus, Thos.
" tenebrosa, Thos.
Œdipoda carolina, Serv.
" nebrascensis, Bruner.
" discoidea, Serv.
" eucerata, Uhler.
" phoenicoptera, Germ.
Œdipoda (?) venusta, Stahl.
" sordida, Burm.
" neglecta, Thos.
" corallipes, Haldiman.
" aequalis, Uhler.
" collaris, Scudd.
" trifasciata, Walker.
" cincta, Thos.
" verruculata, Scudd.
" kiowa, Thos.
" picta, Scudd.
Brachypeplus magnus, Girard.
Stauronotus elliotti, Thos.
Boopedon nubilum, Thos.
" flavofasciatum, Thos.
Pezotettix picta, Thos.
" nebrascensis, Thos.
" unicolor, Thos.
" Scudderi, Uhler.
" borealis, Scudder.
" alba, G. M. Dodge, n. sp.
" junius " "
" autumnalis " "
" speciosa, Scudd.
" gracilis, Bruner, n. sp.
" occidentalis, " "
Ommatolampis viridis, Thos.
Caloptenus bivittata, Uhler.
" differentialis, Thos.
" fasciatus, Scudd.
" spretus, Uhler.
" femur-rubrum, Burm.
" griseus, Thos.

Caloptenus (?) bilituratus. Walk.
" lurida, G. M. Dodge.
" minor, Scudd.
" punctulatus, Uhler.
" occidentalis, Thos.
" regalis, Dodge, n. sp.
" volucri, (?).
" angustipennis, (?).
Acridium americanum, Scudd.
" ambiguum, Thos.
Acridium alutaceum. Harr.
" emarginatum.
Tropidacris dux, Scudd.
Tettix ornata, Scudd.
" granulata, Scudd.
" cucullata, Scudd.
" triangularis, Scudd.
Tettigidea lateralis, Scudd.
" polymorpha, Scudd.
Batrachidea cristata, Scudd.

And in addition I have

3 species of Pezotettix, not yet determined.
2 " Caloptenus " "
2 " Œdipoda " "

And 3 others of different genera not yet determined, making a total of 95 species for Nebraska thus far.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

BATRACHEDRA.

B. striolata ? Zell.

(Asychna ? pulvella Cham.)

In "The Bulletin of the Geo. Survey," v. 3, p. 134, I have referred to two species or varieties of *Batrachedra* found by me in Colorado. Some of these specimens found at Colorado Springs I referred doubtfully to the European species *B. præangusta*. Others found higher up the mountains I named *B. Clemensella*, stating, however, the doubt whether the two forms were really distinct. After the greater portion of that paper was in the hands of the publisher, I received from Mr. Stainton two specimens of *præangusta*, by which I was enabled to recognise my *B. Clemensella* as a variety simply of that species, and to increase my doubts whether the supposed species were really distinct ; for while *Clemensella*

differed slightly from the true *præangusta* in being a little larger and darker, with a slightly different arrangement of the colors, my supposed *præangusta* differed still more from it in the opposite direction, being smaller, with less of the dark colors and also in a slightly different arrangement of them. The European specimens were between my supposed *præangusta* and my *Clemensella* from Colorado, but nearer to the latter. I have no hesitation in referring my *Clemensella* to the true *præangusta*, and I feel very strongly inclined to refer my supposed *præangusta* also to that species, notwithstanding that two out of six specimens of it agree closely with Zeller's description of *B. striolata*, described by him from Texas. I have not been able to recognise any of my specimens in Dr. Clemens' description of *B. salicipomonella*, though those that agree most nearly with the European *præangusta* agree also best with Dr. Clemens' description of *salicipomonella*. In his edition of the Clemens papers, Mr. Stainton, who had seen both *salicipomonella* and the European *præangusta*, says nothing about the question as to whether the forms are distinct, and gives Dr. Clemens' account of *salicipomonella* without comment. Nevertheless, from correspondence with him, I *infer* (perhaps unwarrantably) that he is not altogether convinced that they are distinct species.

In Vol. 8 of the CANADIAN ENTOMOLOGIST, p. 171, I have described under the name of *Asychna ? pulvella* (with the statement that it was not by any means a true *Asychna*) a species which was taken on willow trees in Kentucky, and which approaches nearly *B. striolata* Zell. and the form from Colorado which I first referred, as above stated, to *præangusta*. In these specimens the fore wings are sordid or yellowish white, dusted with fuscous, with a brown streak on the fold, another on the disc and a white spot at the end of the cell; another specimen taken in Kentucky since then has the streak on the fold and a brown spot at the end of the cell—none on the disc. My Kentucky specimens measure from 4½ to 5 lines *alar ex.*; those from Colorado that I referred to *præangusta* (= *striolata* Zell.) measured 5 lines; Mr. Stainton gives 5½ lines as the *alar ex.* of *salicipomonella*, and 7 as that of the true *præangusta*. Zeller gives — as that of *striolata*; and the specimens from Colorado which I named *Clemensella*, but now refer to *præangusta*, measured a little over 7 lines. I doubt greatly whether all are not referable to a single species, *præangusta*, or at most to only two, which are best represented by *præangusta* and *striolata*.

I was led into the error of refering the Kentucky specimens to *Asychna?* by getting hold of the wrong figures of the neuration—combining the neuration of *Bedellia somulentella* with the external characters of *Batrachedra*.

PERIMEDE.

P. erransella Cham.

In perfectly fresh specimens each of the four small tufts of raised scales on the fore wings is seen to be margined behind with white; there is a minute blackish spot at the extreme tip margined before with white, a minute white costal spot containing raised scales at the beginning of the ciliæ, and a row of minute white specks of raised scales around the base of the ciliæ. On the under side these spots are seen reversed, that is, the scales around the base of the ciliae are whitish, and the specks dark brown; there is also a minute brown spot at the apex of the hind wings on the under surface. The tarsi are brown, prettily annulate with white.

The account given at p. 51, v. 6, of the neuration is slightly incorrect; there is (at least in some specimens) one more subcostal branch than is there stated, in the fore wings. The neuration of both wings is thus almost exactly that of *Laverna Staintoni*, as figured *Ins. Brit., v. 3*. The wings are, however, a little more elongate and are narrower. It is closely allied to *Laverna*, but the palpi are nearly as slender as those of the figure of *Anybia langiella (Ins. Brit., v. 3)*, though much shorter; rather like those of *Chrysoclista linniella (loc. cit.)* Its position in repose is singular for an insect so near to *Laverna;* the face is applied to the surface on which it rests, and the abdomen and wings elevated as it rests on the two anterior pairs of legs, with the third pair drawn up alongside the abdomen under the wings—more like an *Argyresthia* than a *Laverna*.

Ravages of White Ants.—The Commissioner of Agriculture recently received from the Consul General at Monrovia, Liberia, a box of twelve books, principally United States public documents, that had been badly damaged by white ants, in several cases more than a third of the book having been destroyed entirely. The damage was done in the space of a few months while the Consul was absent. It is stated in the letter accompanying, that to preserve books and papers from the ravages of this insect, they must be kept free from dust and well exposed to the air.—*Field and Forest.*

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. vii., p. 159.)

[254.] V.—HYMENOPTERA.

[257.] FAMILY SIRICIDÆ.

356. SIREX JUVENCUS *Linn.*—Length of body, mucro included, 11 lines; expansion of wings 20 lines. One specimen taken in Lat. 65°.

Body black-blue, glossy, punctured very thickly on the head and trunk, in which from each puncture proceeds a black hair. Head between globose and triangular, very hairy with a naked spot behind the eyes; cheek terminating in a tooth or point as in the other species of the genus; vertex blue-green; antennæ black, shorter than the thorax; palpi piceous; trunk subglobose, with the central part of the thorax and the part between the four anterior legs tinted with green; legs rufous with the coxæ and trochanters black; wings hyaline with piceous nervures; abdomen naked, terminated by a subtriangular acuminated mucro or horn; ovipositor piceous.

In this specimen the ovipositor is longer and goes further beyond the anal horn than in the European ones, and the horn itself is more dilated at the base.

[258.] FAMILY FŒNIDÆ.

357. FŒNUS JACULATOR *Linn.*—Two specimens taken in Lat. 65°.

The American specimens differ from those of Europe, which also vary, in having the red segments of the abdomen marked with a large black basilar dorsal spot, the former having mostly only a darker cloud. Panzer's figure, however, comes very near the American.

[It is doubtful that the European species occurs in America; they are probably distinct.]

FAMILY ICHNEUMONIDÆ.

358. ICHNEUMON FERRUGATOR *Kirby*.—Length of body 7 lines. Taken in the Expedition, but no locality stated.

[259.] Abdomen black, rather glossy, very thickly punctured with minute and often confluent punctures. Head transverse, triangular, not quite so wide as the middle of the trunk; anterior margin of the face rounded; palpi reddish; eyes long, subelliptical; antennæ shorter than the trunk, spirally convoluted; trunk oblong, subcompressed; scutellum subtriangular, rounded at the apex; metathorax armed on each side with a short tooth, with several elevated longitudinal and oblique lines; legs with decumbent whitish hairs, anterior tibiæ obscurely, and all the tarsi, rufous; wings embrowned with a rufous tint, nervures darker; abdomen lineari-lanceolate, rufo-ferruginous, with the first joint, which is dilated at the apex, black; footstalk channelled longitudinally on each side.

FAMILY CRYPTIDÆ.

359. CRYPTUS VIDUATORIUS *Fabr.*—Length of body, with ovipositor, 5¼ lines; do, without ovipositor, 3½ lines. One specimen taken in Lat. 54°.

Body black. Head subtriangular, transverse, very minutely and thickly punctured; palpi pale rufous; face plane with two elevations in the middle; eyes large, oval; antennæ shorter than the trunk, rather slender, involute, black with a white band in the middle; orbit of the eyes behind with a very indistinct white line; trunk oblong, cubical, gibbous, very thickly and confluently punctured except on the back; tegulæ white; metathorax armed with two minute teeth on each side, one in the middle and the other at the base, forming the terminal angle, marked out into three areas by elevated lines; legs red with coxæ, trochanters, and posterior tarsi black; wings subtestaceous with the larger nervures black; abdomen, excluding the ovipositor, scarcely so long as the trunk; first segment impunctured, glossy, dilated at the apex, which is subquadrangular; footstalk flat; second and third segments very large, with their gloss obscured by infinitely minute punctures; ovipositor shorter than the abdomen; borer red.

[260.] GENUS CRYPTOCENTRUM.

Head between transverse and globose; face quadrangular, with the anterior margin crenate; palpi long, filiform; antennæ slender, first joint thick; second minute; third longer than the rest; trunk ovate-oblong, subcompressed; neck moderately long; scutellum trapezoidal; legs slender, posterior pair elongated; upper wings-apical areolets three; middle four, viz., 2, 2, without a cellule; basilar three; under wings-areolets seven, viz., 4, 3; abdomen sessile, smooth, subcompressed, in the female clubbed at the apex: four first segments longer than the rest, the first curved, rather wider at the apex; the three next are wider than long, the last is minute and triangular; at the extremity the tail is cleft for the passage of the ovipositor; this cleft is formed by the turning up of the sides of the last ventral segment; ovipositor very short; the four last ventral segments, at least in the dead insect, project so as to form an elevated ridge in which the ovipositor is concealed.

360. CRYPTOCENTRUM LINEOLATUM *Kirby*.—Plate vi., fig. 1.—Length of body 6 lines. A single specimen taken in Lat. 65°.

Body very black, somewhat glossy, sprinkled with whitish decumbent hairs. Head subtransverse, hollowed out behind to receive the neck; face with a streak on each side the eyes; feelers and scape of the antennæ on the outside white; antennæ slender, black, externally obscurely testaceous, with a white annulet below the middle; trunk compressed; margin of the collar on each side, tegulæ, and two transverse elevated streaks on the scutellum, white; four anterior legs with the coxæ and trochanters, tip of the thigh and under side of the tibiæ, white; the thighs, except the tip, testaceous; upper side of the tibiæ and tarsi, and long posterior legs, black; wings hyaline with black nervures; abdomen sessile, with the last segments dilated for the reception of the ovipositor; the apical margin of all the segments but the two first is interruptedly white; but in those segments the interruption is not perfect.

[261.] FAMILY BRACONIDÆ.

361. BRACON CROCATOR *Kirby*.—Length of body without ovipositor 3 lines. A single specimen taken in Lat. 65°.

Body very black, glossy. Head subglobose, with the segment of a circle taken out behind; eyes between oval and round; antennæ as long

as the trunk : trunk oblong, widest between the wings ; scutellum rather large, rounded at the apex : metathorax obsoletely transversely wrinkled, sloping towards the abdomen ; posterior legs rather robust ; wings embrowned, middle areolets four, viz., 3 and 1, all quadrangular ; stigma very large ; abdomen lanceolate-ovate, as long as the trunk, saffron coloured, paler towards the apex : the three first segments are emarginate, and marked with two longitudinal faint furrows, the first pair being curvilinear ; ovipositor longer than the body, borer red.

FAMILY FORMICIDÆ.

[262.] 362. FORMICA SEMIPUNCTATA *Kirby.*—Length of body 7¾ lines. Several taken in Journey from New York to Cumberland-house.

Body black, glossy. Head something wider than the trunk, subtriangular ; antennæ piceous with the scape black ; wings cast in all the specimens : scale vertical between the trunk and abdomen, sloping to a thin edge upwards, where it is very slightly emarginate ; abdomen oblong, subcylindrical, minutely punctured with the punctures piliforous ; hairs decumbent with those of the margin of the segments and the anus, longer ; margin of both abdominal and ventral segments membranous, membrane reddish ; base of the three intermediate segments not punctured.

363. FORMICA FUSCA *Linn.*—Length of body 1¼ line. One specimen taken in Lat. 65°.

[263.] ♀.—Body black, but not intensely, glossy, subcinereous from down. Head triangular, large, much wider than the trunk ; antennæ with the scape, the three following joints, and the terminal one, rufous ; the other joints are darker ; trunk oblong, compressed, anteriorly elevated and wider : the prothorax with the scutellum forming a rhomboid ; scutellum large, trapezoidal, subrufous ; scale subtriangular, subemarginate ; legs rufous ; thighs embrowned ; abdomen subglobose, more hairy than the rest of the body, especially towards the anus.

FAMILY VESPIDÆ.

364. VESPA VULGARIS *Linn.*—Length of body 6½ lines. A single specimen taken in Lat. 65°.

[264.] ♀.—Body black, variegated with yellow. Head and trunk thickly clothed with long woolly down of a grayish colour; face with three yellow spots placed in a transverse line behind the antennae, the two lateral ones subtriangular, the intermediate one subquadrangular, with a reddish cloud on its disk; the nose below the antennae is yellow, inclining to red round the margin; it has also three black dots placed in a triangle in the disk, the two lower ones being very minute; the vertex of the nose is also black; the mandibles are yellow with black tips; on the outside the orbit of the eyes is reddish-yellow; the trunk is black underneath; above the posterior upper margin of the collar, the tegulae which cover the base of the wings, and a triangular spot underneath them, are yellow; on the metathorax and scutellum are six yellow spots placed in a double series, the upper and lower pairs being subtriangular, and the intermediate pair crescent-shaped; the thighs are black at the base, but their apex, and the rest of the leg, and a small triangular spot on the inner side of the four posterior trochanters, are yellow; the wings are yellowish red with red nervures; the abdomen, except at the base, is less hairy than the rest of the body; it is yellow with all the segments black at the base; though the blackness in the terminal ones is chiefly concealed by the antecedent segments; in all in the middle it projects into a triangle; the four intermediate ones have also each a round-headed small black spot, the connection of which with the blackness of the base is interrupted in the second segment; on the under side of the abdomen the base of the segments is black, and the intermediate ones have each a pair of rather crescent-shaped black spots not connected with the blackness of the base.

[Kirby states that the specimen above described differs somewhat from the European wasps of this species, but he considers it to be merely a variety of the latter. Later authors state that both *V. vulgaris* and *V. germanica*, European species, are found on this side of the Atlantic.]

365. Vespa borealis *Kirby*.—Length of body 7½ lines. A single specimen taken with the last.

[265.] Body black, downy, especially the head and trunk, with gray hairs. Nose trapezoidal, yellow with a black floriform discoidal spot; anterior margin with three sinuses taken out; vertex with a trapezoidal yellow spot just above the base of the antennæ; antennæ black, luteous

underneath: external orbit of the eyes and mandibles yellow: lateral margin of the collar, a triangular small spot under each wing, two narrow transverse and internally acute spots on the scutellum, and two similar ones below them on the metathorax, all white: tegulæ white with a brownish spot in the disk: legs yellow: thighs black at the base: wings testaceous: abdomen heart-shaped, with the bases of the segments where uncovered, and two dots on each except the first, black: the middle part of the black basal bands projects into a triangular tooth: the under side is nearly similar, but the projections form a longitudinal stripe.

366. VESPA MARGINATA *Kirby*.—Plate vi., fig. 2.—Length of body 7½ lines. Taken in the route from New York, and again in Lat. 65°.

♀.—Body black, punctured, downy from a mixture of black and gray hairs. Mandibles white with a black margin: palpi reddish: nose white with a flask-shaped longitudinal black spot in the disk: just above the antennæ is a bilobed white spot, between which and the eye is a white line, and another external one above it; antennæ short, not much exceeding the head, black with the scape white underneath: in one of the specimens there is a reddish spot underneath on the four or five last joints, which is not discernible in the others: the external margin of the collar, before each wing, and a small triangular spot on each side of the scutellum, are white: wings embrowned with darker nervures, but the costal nervure and tegulæ are ferruginous: legs testaceous, black at the base: abdomen with the apex of the dorsal and ventral segments white: anal segment black with a pair of white spots: the white margin of the dorsal segments receives an intermediate triangular point, and on each side of it a rounded lobe from the black base.

[266.] 367. VESPA MACULATA *Linn.*—Length of body 10 lines. A single specimen taken in Lat. 65°.

[As this insect, commonly known as the "White-faced Hornet," is so abundant in Canada, and has been so often described, it is unnecessary to quote Kirby's description.]

FAMILY PROSOPIDÆ.

368. PROSOPIS ELLIPTICA *Kirby*.—Length of body 3 lines. Three specimens taken in Lat. 65°.

[267.] Body very black, slightly downy, minutely punctured. Apex of the nose white, whiteness lobed; inner orbit of the eyes below the antennae white; vertex channelled below the eyelets; antennae scarcely longer than the head; the projecting lobes of the collar terminate in a white tubercle; base-covers piceous; wings hyaline with dark nervures; metathorax longitudinally wrinkled; posterior tibiae annulated at the base with white; abdomen more glossy than the rest of the body, almost naked, and scarcely punctured; it is narrower and more elliptical than in any other known species of the genus.

[This species and another, *P. affinis* Smith, are found in Canada.]

FAMILY ANDRENIDÆ.

369. HALICTUS RUBICUNDUS *Stephens.*—Length of body 5 lines. Four specimens taken, locality not stated.

♀.—Body black, downy. Head suborbicular, down grayish; space between the eyes broad; down on the thorax thicker, ferruginous; base-covers rufo-piceous; wings subhyaline; nervures and stigma testaceous; post-costal nervure black; legs thickly set with yellow hairs which shine like gold; tarsi testaceous; abdomen elliptical, downy with decumbent hairs; margin of the segments fringed with white hairs, the two first sub-interruptedly; the ventral segments are similarly fringed, but the hairs are shorter.

370. HALICTUS CRASSICORNIS *Kirby.*—Length of body 3 lines. A single specimen taken in Lat. 54°.

[268.] ♀.—This little insect is so extremely like *Halictus lævis*, that at first I regarded it merely as a variety of that species, but upon a closer inspection they appear to me distinct. In *H. crassicornis* the antennae are proportionally more robust, but the principal difference lies in the sculpture of the thorax. In *H. lævis* that part is *visibly* punctured with scattered punctures, but in the insect I am describing, under a common lens, the punctures are scarcely discernible, but under a higher power, besides a slight channel drawn longitudinally, innumerable very minute punctures appear. In the former also the stigma of the upper wings is piceous, while in the latter it is testaceous. In other respects they are perfectly similar.

371. ANDRENA IMPUNCTA *Kirby.*—Length of body 5½ lines. A

single specimen taken in the Journey from New York to Cumberland-house.

♀.—Body black, clothed with rather long whitish hairs, especially the face below the antennae; hairs of the thorax rufescent; wings subhyaline a little darker at the tip; nervures testaceous, post-costal black; brush of the posterior tibia white; abdomen impunctured with the hairs of its anterior half white; the other hairs above and below black.

372. ANDRENA VARIANS *Ross.*—Length of body 5½ lines. Three specimens taken, locality not stated.

[269.] ♀.—Very like the species just described, but the head is clothed with black hair; that of the thorax and base of the abdomen is tawny-red; the brush of the posterior tibia is changeable, as the site varies, from black to white; the hairs of the under side of the body and of the last abdominal segment above are black, except those on the posterior thighs forming the flocculus, which are whitish, as are those of the anterior part of the abdomen.

FAMILY NOMADIDÆ.

373. NOMADA AMERICANA *Kirby.*—Plate vi., fig. 3.—Length of body 4½ lines. A single specimen taken in Lat. 65°.

Body dark-ferruginous. Thorax with a longitudinal mesal black line, less distinct on the metathorax; breast with a black spot on each side; wings, as in the rest of the genus, embrowned with a white spot near the tip; thighs black at the base on the under side; first segment of the abdomen black at the base, and, with the second and third, brown at the apex.

This is the only American *Nomada* I ever saw, and Fabricius describes none from that country. It comes near *Nomada ruficornis* and *striata*, but it has only a single black stripe on the thorax.

[Dr. Packard states that these Cuckoo-bees, the *Nomada*, are very numerous in America.]

[270.] FAMILY CHELOSTOMIDAE.

374. CHELOSTOMA ALBIFRONS *Kirby.*—Length of body 4½ lines. A single specimen taken in Lat. 65°.

♂.—Body black, thickly punctured. Mouth bearded with white; mandibles carinated above, armed with two strong terminal teeth; nose square, flat, clothed with decumbent silver pile; antennæ filiform; scape black; the other joints are rufo-piceous underneath; trunk very hirsute with white or subcinereous hairs; wings a little embrowned, with black veins and base-covers; legs hairy; abdomen subcylindrical, hirsute with black hairs, incurved with the apex of the four intermediate segments fringed with white hairs; anal joint with a concavity above, obtuse; last ventral segment forcipate, rufo-piceous

NEW SPECIES OF LEPIDOPTERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Scopelosoma tristigmata, n. s.

This form, or species, belongs to the series of *Walkeri* and *vinulenta*, of the former of which I was at first disposed to consider it a variety. It is distinguished by the presence of all three of the ordinary spots. Rusty ochre; t. a. line single, even, blackish with the small rusty outlined claviform attached. Orbicular rusty-ringed, with pale centre, small. Reniform pale ochre, rusty-ringed, well sized, of the ordinary shape, with a black inferior stain. Median shade a little waved, joining the reniform above and issuing from it inferiorly. T. p. line much as in *Walkeri*, with the three black streaks on the median nervules unusually distinct. S. t. line margined before with a fuscous shade, pale, irregular; terminal space contrasting, fuscous, with the veins black-marked. Fringes ochreous. Hind wings blackish fuscous, with ochrey fringe. Head and thorax rusty ochre; antennæ paler at base; abdomen fuscous, rusty ochre at sides and tip and beneath. Wings ochreous beneath, with common shade band, flexed on hind wings, which show a discal mark. Expanse 35 mil. Newtonville, Mass., No. 8, April 23, Mr. Roland Thaxter.

Tarache abdominalis, n. s.

This species is parallel with *aprica* and may be distinguished by the blackish abdomen, ringed with white. It varies in the color of primaries and thorax. In some specimens the fore wings are white from the base to exterior line with two dark costal patches as in the type *aprica*. The exterior line is heavier and more metallic than in *aprica*. The subterminal line is notably less inwardly projected than in *aprica* below the median nervules. Again, the fore wings are more or less blackish at base, leaving two white costal blotches as in *biplaga*. Beneath the two forms are to be quickly distinguished. In *abdominalis* the wings are yellowish, the hind wings with a terminal blackish band, two discal longitudinal rays from the base and a transverse fascia broadly marked on costa in the best marked specimens; the rays and transverse fascia become more or less obsolete. Above the hind wings are black or blackish, sometimes pale yellowish on disc, always darker than in *aprica*. Thorax and head blackish; tegulæ more or less white on the sides. Expanse 25 mil. Hab. Texas (Belfrage No. 596); also collected by Heiligbrodt, in Mr. Meske's collection. The colors of the dark outer portion of the fore wings are brighter than in *aprica*, the band before t. p. line more olivaceous, the subterminal line more tinged with brown. I have to thank Mr. v. Meske for drawing my attention to this form, which from the description cannot be *obatra* of Mr. Morrison.

Geometra rectaria, n. s.

♂. This species is smaller than *iridaria*, of a rather more dull green and with one-half narrower white lines. Costa of primaries whitish, much marbled with fuscous. Inner white line of primaries perfectly *straight*. Outer line extending across hind wings in same position as in *iridaria*. Minute black discal points on both wings. Fringes concolorous, not paler as in *iridaria*. Head white; palpi brown at tips. Legs white with black dots at extremities of second and third joints. Beneath secondaries a little paler than primaries, on which alone the minute black discal points are legible. The common exterior line is indistinctly shown. Tegulae and collar green; dorsum of thorax discolorous. Expanse 25 mil. Hab. Texas (Belfrage, No. 323).

This species differs from Mr. Walker's descriptions of forms unidentified by Dr. Packard more broadly than from *iridaria*. The wings and body are proportioned as in *iridaria*. From the description I should not refer

Geometra mimicata Walk. to this genus. *G. rectaria* may be included by Dr. Packard among his Texan material of *iridaria*, but I do not think it is the same ; the green fringes seem shorter, the narrow lines, the inner one on primaries perfectly straight and the more brown and inconspicuous costal edging are as strong as specific characters seem to be in this group. The dot on hind wings beneath is obsolete ; there are no white markings on the veins.

ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The annual meeting of this Club will be held at Nashville, Tenn., on Tuesday, the 28th of August, at 3 p. m. The regular meetings of the Association will commence on the following day. The pleasures connected with the annual re-union of Entomologists during the meetings of the Club will, we doubt not, attract to Nashville many of the "brethren of the net." The citizens of Nashville are offering private hospitality to all the members of the Association who will accept it, and have also made arrangements for hotel accommodations and railway tickets at reduced rates. We hope to hear of a large attendance.

CLISIOCAMPA SYLVATICA — THE FOREST TENT CATERPILLAR.

BY THE EDITOR.

The larvæ of this moth (see fig. 6) have been enormously abundant this season in the vicinity of London, Ontario. Vast swarms numbering millions upon millions consumed the foliage of fruit and forest trees during

the latter part of May and the early weeks of June. By the 5th of the latter month they had become about two-thirds grown, when the daily consumption of foliage was so immense that their presence attracted general attention and the most vigorous onslaughts were made on them from all sides. But notwithstanding they were slain every day by millions, their numbers seemed scarcely to diminish. In many places the forests by the middle of June were so completely denuded that they afforded but little more shade than in mid-winter, trees of all kinds suffering severely. They attacked the oak, ash, basswood, maple, thorn, cherry, beech and hickory, as well as almost all sorts of fruit and ornamental trees, and during June their activity in travelling from place to place was so incessant that the most constant vigilance was required to save favorite trees from destruction. Their habit of congregating in large masses on the trunks of the trees they fed on in the mornings rendered their partial destruction comparatively easy; had it not been for this scarcely a leaf would have been left on any of the trees named in the whole neighborhood.

Fig. 6.

When the larvæ began to change to chrysalids they sewed up the remaining fragments of the few leaves still unconsumed on the trees into all kinds of curious shapes, each enclosure frequently protecting two or three cocoons. These cases hanging pendant with the weight of their contents, and with the paler under surfaces of the leaves displayed, looked in many instances as if a crop of some strange fruit was maturing. On gathering a number of the chrysalids, a very large proportion of them were found infested with parasites, chiefly dipterous, with occasional examples of the hymenopterous order.

Early in July the evenings were enlivened by large numbers of the moths which flew vigorously about in lighted rooms, thumping against everything in their erratic and apparently aimless flight. In a few days their egg masses were to be seen in considerable numbers on the branches of fruit and forest trees, where they will remain, unless otherwise destroyed, until the period of their hatching next spring.

MISCELLANEOUS.

PAPILIO THOAS.—On the 1st and 2nd of August, I had the pleasure of capturing in a field near Amherstburg, Ontario, eleven specimens of *Papilio thoas*, most of them in good condition, besides a number of other species of butterflies. The specimens of *thoas* were all taken on the flowers of thistles.—J. M. DENTON, London.

CISTHENE SUBJECTA.—Early in July the writer captured two specimens of this elegant little moth, generally very rare here, on the blossoms of Milkweed (*Asclepias cornuti*). Their legs had been caught in the sticky substance which exudes from the sides of the flowers, and thus they were held firmly.—ED. C. E.

MELITAEA PHAETON.—For two or three years past I have searched in vain throughout this locality for *M. phaeton*, but this season I have taken all that I wanted; indeed, they were so abundant that at one time I might have taken a hundred in a few hours had I wished to do so. I have taken also a specimen of *Myrmeleon obsoletus* Say, and one of *Psycomorpha epimenis* Drury, both rare in this neighborhood.—J. ELWYN BATES, South Abington, Mass.

AMBLICHYLA CYLINDRIFORMIS.—We are indebted to our friend, Mr. S. W. Williston, of New Haven, Conn., for a very fine specimen of this hitherto rare insect, which reached us by mail from Kansas in excellent condition. On opening the small tin box in which it had been confined, it seemed as healthy and vigorous as possible, moving briskly around in its endeavors to escape. It is a very handsome creature, and will prove a most acceptable addition to our cabinet.—ED. C. E.

FOOD PLANT OF S. CECROPIA.—We have taken the larvæ of *cecropia* this year feeding on the European Alder; they were nearly full grown, and the amount of foliage consumed on the young trees left little doubt that the eggs had been laid and the larvæ matured entirely on these trees.—ED. C. E.

I have taken at sugar this season *Sphinx Kalmiæ* and *myron*.

Is it not unusual to see *Catocalas* about in day time? Recently I took *C. subnata* feeding on the edge of a swill barrel at mid-day—the barrel standing in the shade, however.—W. L. DEVEREAUX, Clyde, N. Y.

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A NEW LEPIDOPTEROUS INSECT INJURIOUS TO VEGETATION.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

(Read before the Am. Asso. Adv. Sci., August 30, 1877.)

In the months of June and July the Red Pine *(Pinus resinosa)* and and the White Pine *(Pinus strobus)* show by the exuding pitch that they are suffering from the attacks of an insect. The wounds occur on the main stem below the insertion of the branch. On cutting into the bark the injury is found to be caused by a small larva, which, when full grown, measures 16 to 18 millimetres. The head is shining chestnut brown with black mandibles. The body is livid or blackish green, naked, with series of black dots, each dot giving rise to a single, rather stout, bristle. The prothoracic shield is blackish. The larva has three pair of thoracic or true jointed feet, and four abdominal or false feet, besides anal claspers. This larva, eating on the inner side of the bark, and making furrows in the wood, causes the bleeding which, when the depletion is excessive or continuous, and especially in the case of young trees, has proved fatal.

In July the worm spins a whitish, thin, papery cocoon in the mass of exuding pitch, which seems to act as a protection to both the larva and the chrysalis. The chrysalis contained in the cocoon is cylindrical, smooth, narrow, blackish-brown, about 16 millimeters in length. The head is pointed, there being a pronounced clypeal protuberance; the segments are unarmed; the anal plate is provided with a row of four spines, and two others, more slender, on either side of the mesial line, below the first. It gives the moth in ten to fourteen days. The perfect

insect expands on an average 30 millimeters. An examination of the veins of the wing shows that vein 7 of the primaries is wanting, while vein 1 is simple. On the hind wing the cell is closed or very nearly so. It belongs thus to the *Phycidæ*, a sub-family of the *Pyralidæ*. The male antennæ are bent a little at the base, the joints inconspicuous; the maxillary palpi in the same sex are not brush-like, and the hind wings are 8 and not 7 veined. We may refer the moth, then, to the genus *Nephopteryx*. Veins 3, 4 and 5 spring nearly together from the outer extremity of cell of the hind wings (though 5 seems to be nearly independent while running close to 4); vein 2 is not far removed from 3. On the primaries veins 4 and 5 spring from a common stalk, so that we must refer the moth to the sub-genus *Dioryctria* of Zeller. In color the moth is blackish gray, shaded with reddish on the basal and terminal fields of the fore wings. There are patches or lines of *raised* scales on the basal field and on the anterior and darker portion of the medium space. The median lines are prominent, consisting of double black lines enclosing pale bands. The inner line at basal third is perpendicular, W-shaped or dentate. The outer line at apical fourth is once more strongly indented below costa. The black component lines do not seem to be more distinct on one side than on the other of the pale included bands or spaces. The median field is blackish, becoming pale towards the outer line; it shows a pale, sometimes whitish cellular spot, surmounted with raised scales. It can be seen that these raised scales (easily lost in setting the insect) accompany the median lines as well as forming the discal mark and the linear patch on the basal field. The terminal edge of the wing is again pale or ruddy before the terminal black line. The fringes are blackish. The hind wings are pale yellowish white, shaded with fuscous on costal region and more or less terminally before the blackish terminal black line; the fringes are dusky. Beneath the fore wings are blackish, marked with pale on costa; hind wings as on upper surface. Body blackish gray, with often a reddish cast on thorax above and on the vertex. The eyes are naked, the labial palpi long, ascending, with moderate terminal joint. Tongue rather long. The gray abdomen is annulated with dirty white, the legs are pale dotted. The species differs from the European *abietella* by the raised scale tufts on the wings, and Prof. P. C. Zeller, who has kindly compared examples for me, declares it to be quite distinct from any European species. The pupa seems to differ from that of *abietella* by the clypeal prominence, which appears entirely absent in the European

species, judging from Ratzburg's excellent figures. The larva is found to attack also various imported conifers; for this reason I supposed it might be an imported parasite. It has been noticed on the Scotch, Austrian and Russian Pine, and it will be found, I fear, a grave enemy to the cultivation of this genus of plants.

Since the insect is not noticed yet in any scientific publication, I propose to name it *Nephopteryx (Dioryctria) Zimmermani*, after Charles D. Zimmerman, of Buffalo, who has made many excellent observations on our noxious insects, and to whom I am greatly indebted for help in getting the present facts with relation to the species. He has kindly spent much time in climbing large trees and cutting out pupæ and larvæ and rearing the perfect insect.

The larva of *abietella* is described by Ratzburg as living in the cones chiefly of various species of *Pinus*. Nevertheless, he speaks of one instance in which it is found under similar circumstances to those which are usual with *Zimmermani*, which latter I have not yet noticed attacking the fruit. The European species is said to winter in pupa state. In the vicinity of Buffalo our species seems to be single brooded. I have not yet ascertained the winter state. Ratzburg recommends cutting off infested branches, but especially on small trees. I find the larva of *Zimmermani* usually infesting the *main* stem at the insertion of the branches. From the fact that the pitch of the trees offer a protection, I do not think that any washes would reach the insect. The knife, then, seems the only remedy.

Our species has a natural enemy in a small hymenopterous parasite with which I have found certain of the chrysalids to be filled.

ON THE HABITS OF AMBLYCHILA CYLINDRIFORMIS.

BY S. W. WILLISTON, NEW HAVEN, CONN.

The great interest in which this beetle has been held by Entomologists for so long has rendered an accurate account of its habits very desirable; but for a very long period—over twenty years—it has singularly eluded more experienced observers. In the Proceedings of the

Kansas Academy of Science for 1876, a slight account was published by Mr. H. A. Brous, but from the very small number taken by him, his article was necessarily imperfect. I have taken more than five hundred living specimens from the plains of Western Kansas during the past two years, and have watched their habits closely. Without being aware of Dr. LeConte's suggestion as to their nocturnal habits, one would readily arrive at that conclusion from the large numbers of their remains constantly met with scattered about, or in the excrement of nocturnal birds. With the first living specimen their peculiar habitat was readily understood. They may be met with in great abundance on gently sloping banks of firm loam, but partially covered with vegetation; they will not live in banks at all sandy. They never burrow, but enter any convenient hole at the approach of the sun, to come out again and wander in search of food at sunset. In cloudy days they will remain out, but with the first sunlight they disappear into their retreats, not to return until evening. The first one taken this year was on a pleasant evening in May, the 21st; but, though hunted for assiduously, no more were taken till near the middle of June. In a week or two later they were found in the greatest abundance.

The males, at first numerous, invariably soon begin to decrease in number, and are more abundant early in the evening. By the middle of September the females also have become rare.

The eggs are deposited near the surface of the ground, in groups of from one to two dozen. The young larvæ immediately burrow downwards, but come to the surface at dark to lie in wait for food, which consists mostly of ants and small insects. The holes are extended to surprising depths. In some instances I have traced them for nearly three feet. The mature larvæ are over two inches long, with very strong mandibles and maxillæ. They may be found most readily either in May or August. Singularly unlike the imago, they are very shy and easily alarmed.

The adult beetle might very appropriately be called stupid. Their power of sight is *extremely* feeble. Wandering aimlessly about in search of food, they are first apprised of their prey by their antennæ, when by a short, sudden spring they fasten their relentless mandibles into their victim.

Their food consists in large part of the smaller apterous Tenebrionidæ, such as the *Eleodes* or *Asidæ* that are found on the plains in such abundance, especially during the time and in the places so peculiar to the

Amblychila. Such Orthoptera as they are able to seize, they eat with the greatest avidity, but it is *very* rarely that they are able to catch any but the slow moving walking-sticks. They also devour a great many ants. They never feed on effete or decayed matter.

A dozen or more, when confined in a small space, will rarely injure one another, but are readily kept captive, eating any fresh animal food and even thriving on fresh meat. Their appetite is by no means small! They never heed an observer or collector till touched.

The males in the great majority of cases are larger than the females and may be readily distinguished by the sharp-pointed trochanters of the hind coxæ.

DESCRIPTION OF THE PREPARATORY STAGES OF PHYCIODES HARRISII, SCUDDER.

BY W. H. EDWARDS, COALBURGH, W. VA.

I received, 25th June, from Mr. C. P. Whitney, New Milford, N. H., a cluster of about 50 eggs of this species, laid on the under side of a leaf of *Dipopappus umbellatus*, date of deposition not stated. The larvæ hatched 28th June. The food plant not being obtainable by me, I gave them leaves of *Chelone glabra*, on which *phaeton* feeds, but so long as the least bit of the dry leaf of *Diplopappus* on which they hatched remained, the larvæ declined the *Chelone*, and then after starving many hours they attacked it vigorously. But, meantime, for want of proper food, several died. They manifested alarm just as do the larvæ of *nycteis* and *phaeton*, by a jerking motion of the body from side to side, the last segments being fixed to the leaf, and all the larvæ jerking together. This is contrary to the habit of *thaws* so far as observed, nor have I seen it in other species. On 2nd July the first moult was passed, and the larvae now utterly refused *Chelone*, although gnawing the edges of a bit of white paper in their hunger. I gave them Aster and on this they fed readily to the last, eating any species indifferently. On 7th July they were passing second moult, and on 12th and 13th, the third moult. Shortly after this

they stopped feeding and gathered in a cluster on the cover of the glass in which they were kept, and became lethargic. Their behavior throughout was like the larvæ of *nycteis*, though they are cleaner in feeding than that species, which keeps itself in a mire on the leaf. No web at any stage was spun for protection or other purpose, and they are hybernating now on a slight mat of silk made upon the cover of the glass.

Earlier this year, May 24th, I received from Mr. Whitney about a dozen larvæ of this species, found by him soon after awaking from their hybernation. These were of all stages from just after second moult to the fifth, or the mature larva, and one made chrysalis 26th May. From this the butterfly emerged 4th June. Evidently these larvæ hybernate after both second and third moult, as do those of *phaeton* and *nycteis* and *tharos*, though all which I now have in hybernation (16 in number) have passed the third. In all stages the larvae resemble closely those of *phaeton*, changing from ochraceous, lighter or darker, to deep fulvous, and striped with black. So the spines and their branches are those of *phaeton*, and differ much from *nycteis*, as the coloration of the body differs. The egg also is nearer *phaeton* than *nycteis*, but the sides are more sloping and less rounded, and the ribs spring from the base instead of the middle of the side. The chrysalis is shaped like that of *tharos*, and colored like that of *phaeton*. There is much variation in the coloration in individuals. One of the larvae was nearly black at maturity, the fulvous being represented merely by a few dots and small spots. The butterfly from this larva is very melanic on both sides, in as strong contrast to the rest of the brood as was the larva. The species is single brooded, like *phaeton*, while *nycteis* is double brooded in W. Va., and *tharos* many brooded.

EGG—In shape a frustum of a cone, flattened at base, the top a little depressed, the sides but little rounded, ribbed, the ribs standing well apart, 15 or 16 in number, and starting from the base, increasing in elevation above the surface as they approach the middle, then decreasing to the summit; color lemon yellow.

YOUNG LARVA—Length $\frac{1}{50}$ inch.; cylindrical, the segments well rounded; color yellow-green, semi-translucent; somewhat pilose; head obovoid, bilobed, the vertices rounded; larger than second segment; color dark brown.

AFTER FIRST MOULT—Length $\frac{3}{100}$ inch.; thicker in middle segments; armed with seven rows of short black spines, thick at base,

tapering, and thickly set with short black bristles: there is also a row of small, similar branching spines over the feet: color yellow brown, the second segment quite dark, and on this is a collar of minute branching spines; there is also a dark medio-dorsal line; head obovoid, rather flattened frontally, the vertices rounded: color black brown, with many black hairs.

AFTER SECOND MOULT—Length ⅛ inch.; shape and spines as before; color ochre-yellow, with five transverse black lines on the segments, and a dark medio-dorsal line; head as before, black.

AFTER THIRD MOULT—Length ⅛ inch.; spines and bristles larger in proportion; color deeper ochre, striped as before.

AFTER FOURTH MOULT—Length ¼ inch.: color red, or orange ochraceous: the transverse lines distinct, and edged unevenly, one before each row of spines and two after; at base of body, on feet, an ochrey ridge; the spines short and stout, with very divergent bristles: head as before, the surface finely tuberculated, black.

AFTER FIFTH MOULT—Length ½ inch., increasing to ⅝, and in one example to one inch at maturity.

MATURE LARVA—Cylindrical, of nearly even diameter throughout: color deep red fulvous, crossed by black stripes, one before and two after each transverse row of spines, and with a medio-dorsal black longitudinal stripe: the last two segments nearly all black, and on 9 to 11 the fulvous bands are macular; the spines on each segment also stand on a broad black band; spines in seven principal rows, one dorsal, three lateral on either side, long, tapering, black, each thickly set with long divergent black hairs, and each rising from a broad, round, shining black, or blue black base; over the feet a similar row of small spines; the second segment with a collar of small branching spines; feet and prolegs black; head obovoid, flattened frontally, cleft, the vertices rather pointed than rounded, black, granulated, and with many short black hairs.

CHRYSALIS—Length ⅝ inch.; cylindrical; head case compressed transversely, nearly square at top, bevelled at the sides: mesonotum rounded, not prominent, followed by a slight depression; abdomen stout, with several rows of small sub-conic tubercles, two of which are extended to upper side of mesonotum; color pure white, marked and spotted throughout with black, or brown black, and orange, and showing much variation in individuals; the last segments black; a broad band of black

on the ventral side reaches from the head case to lower end of wing cases, and the abdomen has orange bands between the segments ; on the wing case a curved black band crosses longitudinally, and in this the nervules of the wing are orange ; there is also a row of black dots or small spots about the hind margin ; the tubercles orange, and nearly all have a black crescent on the anterior side ; on the posterior side of the abdominal segments are also small black spots. The coloration varies much, and some examples are almost deprived of the black markings, while retaining the orange.

NOTES ON CATOCALÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Catocala junctura Walk.

Dr. Bailey has taken near Albany a little larger form than *unijuga*, with rather paler primaries and much the same markings. The hind wings are a little more pinkish, without the dusky basal hairs of *unijuga*. The band is a little narrower than in *unijuga* and terminates much before the internal margin. It tallies with my recollection of Walker's type of *junctura* in the British Museum, and I am disposed to think that *junctura* is now rediscovered.

Catocala Anna Grote.

Mr. Thos. E. Bean has taken this species in Illinois. It varies slightly in the terminal band being sometimes entirely broken before anal angle.

Catocala Frederici Grote.

This species, described by me from types in the Royal Museum at Berlin, taken by Friedrichs in Southern Texas, has now been rediscovered by Belfrage in Bosque Co. Mr. Belfrage sends me a specimen under the number "672," taken on pine, which agrees perfectly with the original description and with a water-color drawing made from the Berlin speci-

mens by Tieffenbach, and sent me by the late Prof. Hopffer. The species is a little smaller than *illecta* (= *magdalena* Strecker) and may be easily recognised by its pale greenish-gray, mossy primaries, with the lines dusky and rather diffuse. The hind wings are light yellow with the median band straight, terminating before the margin with a short, rather abrupt curve. The terminal band is abbreviate, narrow, scalloped on its outer edge over the median nervules. There is a small black spot on the margin before anal angle. The species is very distinct and can be mistaken for no other.

Catocala abbreviatella Grote.

I have this species from Illinois, taken by Mr. Bean. The t. a. line is straight, outwardly oblique to below median vein, when it becomes obsolete. It is not black shaded as in *Whitneyi*, which I have from the same locality. The three species, *nuptialis* (= *myrrha* Strecker), *abbreviatella* and *Whitneyi*, form a series of allied forms, but can be sufficiently and readily distinguished.

Catocala gracilis Edw.

The form described by Mr. Edwards has the primaries light gray, the lines broken and the internal margin more or less shaded with blackish. The species recalls the concluding *amica* group in the colors, bluish gray primaries and bright hind wings, and I have put it last in the series on this account. I am not certain now what Mr. Edwards' *similis* is. In Mrs. Bridgham's collection is (or rather, was) a specimen labelled *similis* by Mr. Edwards, which belonged to what I consider as a variety of *gracilis*, having the primaries mixed bluish gray, rather dark and somewhat hoary. The lines are distinct, or usually so, and the basal dash of *gracilis* is wanting. This last seems the only important character, but it is present in var. *basalis* of *habilis* and wanting in the type. This dark form (which seems also a little shorter winged) has been taken with the type by myself near Buffalo, and by Dr. Bailey near Albany. I have seen it also from Pennsylvania. In the collection of the Ent. Soc. of Phil. there is a specimen labelled *similis*, which in my "Revision" I have referred to as belonging to this variety of *gracilis*. But Mr. Edwards' description will not agree in this that he says: "beyond is a ferruginous band followed by a gray line which is dilated on the costa so as to make a triangular apical spot." This and the size will not correspond, and it is probable that Mr.

Edwards has described some one other of our yellow-winged smaller species, and has afterwards mistaken his species, or mixed up different forms at the same time. This mixed dark blue-gray form, with distinct black lines and without the small basal streak of *gracilis*, I propose to designate by the name *serahda*: it varies as *gracilis* does in the suffusion of the primaries along internal margin with black in some specimens. Both the description and the type of Mr. Edwards' *parvula* correspond to that form of *minuta* which has this dark suffusion on primaries. *C. minuta* is allied, though a smaller form, to *fratercula;* both forms have the dentate white subterminal line usually obvious. From an examination of Kansas specimens, no doubt remains on my mind that *atarah* is founded on more generally obscure specimens of *fratercula*. An example of *fratercula* in the collection of Dr. Bailey has the primaries suffused with black over the median space.

NOTES ON THE LARVA AND PUPA OF EUCHAETES COLLARIS.

BY G. H. VAN WAGENEN, WESTCHESTER CO., N. Y.

I have, for three seasons, raised *Euchaetes collaris* from the larva, it being very abundant in this locality, and present the following notes as the result of my observations:

The larvæ feed on the *Apocynum androsaemifolium*, or Spreading Dogsbane. They will in confinement feed on *Asclepias*, but I have never, after careful search, found but one of the larvæ on it in the field. They feed at night, leaving their food-plant and hiding themselves during the day. About dusk they will be found crawling up the stems of the *Apocynum*.

Unlike *egle*, which feeds in companies, these are solitary feeders, and I have never found more than two on the same plant; generally there is but one. The color of the hairs in the early stages of the larva is almost white, but changes to slate color when ready to go into the chrysalis.

The early broods go into the chrysalis state about the end of July, and the imago appears in ten days or two weeks. The later broods remain in

the chrysalis during the winter, and emerge in the following June. They spin a slight cocoon between the leaves or on the ground. They are very easily raised, and require little feeding, eating much less than *egle*. The moth appears here from the middle of June to about the middle of July, and again the latter part of August.

I am indebted to Dr. Lintner, of the State Museum at Albany, to whom I mailed specimens of the larvæ and pupæ, for the following scientific description. The Dr. states that these specimens were not in the best condition for the purpose, "having lost many of their hairs from rolling," but on comparing his description with larvæ fresh from the plant, it seems to me perfectly correct.

LARVÆ OF EUCHAETES COLLARIS.

Sub-cylindrical, tapering moderately at the extremities. Head nearly as large as the first segment, pale luteous with black ocelli; body pale bluish white, semi-transparent; the pro-leg bearing segments with twelve rows of tubercles, from which radiate pearl-gray branching hairs varying from sparsely sub-spinose to thickly branched, which dorsally are about the length of the diameter of the body, except on the last three segments, where are some twice as long; the lateral hairs are shorter, but perhaps from attrition; the longer hairs tend to unite at their tips in pencils of a slaty hue. The tubercles, in their location on the segments referred to, alternate between their anterior fourth and posterior third; the sub-dorsal ones are oval, the lateral ones elliptical, the latero-stigmatal sub-rotund, as are also the much smaller stigmatal ones; the form of those of the two inferior rows is not evident. The stigmata are small, narrowly elliptical, white, annulated with black. The legs are unicolorous with the body, the terminal pair quite projected backward.

Length of the larva at rest, .87 inch; in motion, 1.12 inch. Diameter at broadest part, .16 inch.

The cocoons are slight, consisting almost wholly of the hairs of the larva, closely investing the pupa, their length from one-half to five-eighths of an inch, with a diameter of about one-fourth of an inch.

The pupæ are black, closely punctated, ovoid, the terminal segments blunt and unarmed, the thoracic portion projected over the wing-bases in a sub-quadrate form.

PROCEEDINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Room 56, Maxwell House, Nashville, Tenn., Aug. 31, 1877.

Mr. Grote was called to the chair and congratulated the meeting that there were found members from the South interested in the science of Entomology, and regretted the absence of the President of the Club and other officers. A letter was read from President LeConte as follows:

Philadelphia, Aug. 24th, 1877.

Secretary of the Entom. Club Am. Assoc. Adv. Sci., Nashville, Tenn.:

DEAR SIR, —I beg that you will express to the Entomological Club of the Association my great regret that I am not able to attend the meeting at Nashville. It was my intention to be present, but I find now at the last moment that it will be extremely inconvenient for me to leave this city. I greatly wished to take part in the discussion on nomenclature, but I have already expressed myself so strongly as against such changes as are produced by the rehabilitation of forgotten or disused names, that I think my opinions are fully understood by my colleagues

Very truly yours,

JOHN L. LECONTE.

The Secretary's report of last year's meeting was received and adopted.

The chair drew the attention of the Club to the report of Capt. Dall on the subject of Zoological Nomenclature made at this meeting, and deprecated any separate action on the part of the Club.

The following resolutions were then passed:

Resolved—That since the Association has under consideration the subject of Nomenclature, the present Committee of the Club on that subject, consisting of LeConte, Riley, Saunders, Scudder and Grote, be continued to report at next meeting.

Resolved—That a request be made on the part of the Club to the Standing Committee of the Association, that copies of Capt. Dall's report on Zoological Nomenclature be printed and distributed to all active members of the Club before the issuance of the Nashville volume, so that the matter may be duly considered before the next meeting of the Club.

The meeting then entered into an election for officers for the next meeting, with the following result :

President : James A. Lintner, of Albany, N. Y.
Vice-President : Wm. Saunders, of London, Ontario.
Secretary : B. Pickman Mann, of Cambridge, Mass.

Mr. Grote exhibited specimens in all stages of the new Pine Moth, *Nephopteryx Zimmermani.* He referred to Mr. Meehan's remarks after the reading of the paper before the Association on Thursday last, that this was probably the insect so destructive to the Scotch Pine about Philadelphia.

Prof. Nicholson stated that he thought from Mr. Grote's description and specimens that this insect was the one noticed as attacking the Scotch Pine near Knoxville. The trees had been imported from the north.

Mr. Grote alluded to the migratory habits of the Cotton Worm, and stated that in his original paper (Hartford meeting) he had shown that the moth hybernated, but died before it could find cotton on which it could oviposit the ensuing year. Where the moth state was not reached the chrysalis perished in cold winters over the cotton belt. The broods were irregular, occurring in the same locality some years as early as June, some years as late as September.

Prof. Stubbs stated that in the main Mr. Grote's theory of a progression from south to north was, he was satisfied, correct. At the same time he called attention to occasions where the moth appeared in small areas, and thought it possible that in some cases the insect might succeed in holding over.

Mr. Grote stated that he thought that in localities where the circumstances were favorable, Southern Florida and along the coast of Georgia, that this might occur. He had in his original paper alluded to this, and he thought it more likely that the irregular patches on the cotton belt were partial colonizations from the southward or from the sea coast of Florida and Georgia. The first brood was more irregular in distribution. He further said that Prof. Tutwiler, of Ala., had told him that the observations made in his locality were to the effect that a south wind brought the worm ; in the present year the prevailing winds were from the north and they had been free from the worm in Northern Alabama. Mr. Grote concluded by urging the creation of a scientific commission to look into

the facts of the case. It was one that was the most important to the agricultural interests of the South.

Prof. Nicholson stated that he had observed a few specimens of the Colorado Beetle near Knoxville; the seed had been brought from the north.

Judge Bell stated that this year he had seen the Potato Beetle at Exeter, New Hampshire.

Mr. Grote exhibited some rare Coleoptera collected at Buffalo, N. Y., by Mr. Ottomar Reinecke. Adjourned.

(Signed) A. G. WETHERBY, Sec'y *pro. tem.*

NOTES ON SOME SPECIES OF HOMOPTERA.

BY THOS. E. BEAN, GALENA, ILLINOIS.

The suggestion of Mr. Hill (quoted on p. 89) that *Homopteras* "*edusa* and *lunata* are possibly sexes of one species," has reminded me of my own doubts regarding not only *edusa* and *lunata*, but also *Saundersii*, and caused me to make a careful examination of my material.

My entire stock numbers 83 local specimens, arranged after authentic types in three series, consisting of 42 "*lunata*," 24 "*Saundersii*," and 17 "*edusa*."

The specimens separated as *lunata* show no white lines or areas on upper side of wings.

The *Saundersii* have two large ovate or crescent areas on outer edge of primaries, and one similar but still larger crescent on outer edge of secondaries; these areas are partly outlined with white or greenish-white, especially on the inner side. There are also white or greenish-white ill-defined bands across fore wings at region of anterior transverse line.

The *edusa* are like the last in appearance in all respects, except that the six marginal lunates are filled out with white, or pearl, or greenish-white.

After repeated observation and comparison of these 83 specimens, I feel no particular hesitation in declaring that the 42 *lunatæ* are all females, the 24 *Saundersii* and the 17 *edusæ* all males.

Examination of the three series above mentioned appears to make evident the following results :

First—That the specimens do *easily* distribute into said three sets.

Second—That in general appearance the *Saundersii* and *edusa* series would be almost or quite indistinguishable but for the fullness of white on margin spaces of latter form, which constitutes so conspicuous a distinction.

Third—From the other two series that of *lunata* not only differs in lacking the white decoration, but is also different in the tone, the hue and depth of the diffused shades of color on the wings ; so that *lunata* differs from the other two markedly more than those differ from each other.

Fourth—Aside from mere color and shading, the definite markings are *alike in the three series.* Upon the basis of the characteristic lines alone, tone not taken into account, it would be safe to say that if there are two or more species within the limits of the entire set of specimens, then the same two or more species can also be found in *each* of the three series as above arranged ; that is, there is as much *essential variation* in either series as between any two series, or very nearly as much.

Fifth—By superior robustness of body, and especially greater fullness of abdomen at post-median region, as also in regard to antennæ, the specimens in *lunata* series differ strikingly from those of the *Saundersii* and *edusa* series. From these characters, with the difference of tone and absence of white clouding, I conclude that *there is a valid distinction of the lunata set from the other two.*

This distinction of *lunata* from the others must be either of species or of sex. As the *Saundersii* and *edusa* series differ unimportantly, by presence of a little white or much white, a distinction which alone is not valid either for a difference of species or sex, and as *these seem to be males :* as, furthermore, the *lunatæ* do validly differ from the others for species or else for sex, and *these seem to be females :* and as, finally, the three sets are alike in the definite lines important as criteria of specific difference—I therefore conclude *Saundersii* and *edusa* two male forms, and *lunata* the female form of one and the same species.

DETAILS OF COMPARISON.

Among the lunatæ there is only moderate variation, consisting chiefly in less or greater development of the brown suffusion and the blue-black shades; in about seven specimens the dark shading is largely obsolete and replaced by light brown in an area on f. w. from t. a. line to t. p. line and beyond, extending partly to outer margin, but not reaching costa. There is an appreciable though slight variation as to curves and dentations of t. p. line.

The Saundersii present moderate variation as to amount of the white decoration, and in several specimens this is almost replaced by greenish white. There is some variation in tone of coloring, in degrees from medium brown to dark, somewhat purplish brown. One or two show on f. w. a somewhat yellowish light-brown area between t. a. and t. p. lines, not reaching costa. A little variation in t. p. line.

The edusæ vary slightly as to fullness of the white ovals or crescents on margins. Also as to color of same; some have crescents entirely white, others have them greenish but outlined with clear white. On f. w. of two examples area from t. a. to t. p. line is colored nearly uniform yellow-brown, the dark shades almost obsolete. Regarding variation in tone of coloring, the comment on *Saundersii* applies equally to this set.

EDUSA AND SAUNDERSII COMPARED.

Closely alike in size; if any difference, the latter average slightly larger.

Coloration, except as to degree of white, furnishes no means of separation.

In *Saundersii* the marginal crescents are merely sketched or outlined with white, pearl, or greenish-gray; in *edusa* the crescents are filled out with an amplitude of white, &c., some specimens showing greenish-white crescents outlined with clearer white. *Saundersii* looks like an unfinished *edusa*.

In observing the white decoration, at first the division of the two sets seems complete, but closer search discovers one *edusa* from whose marginal crescents the white is about half obsolete, and among the *Saundersii* are two whose crescents are so largely powdered with white that the step between these two and the cited *edusa* is no wider than the interval

between these two and the other *Saundersii*. Still, aside from these three, the specimens in either set are greatly uniform among themselves and the contrast is great between the two sets *as to this feature of decoration with white.*

I am unable to find other severance than by this white decoration; indeed, the two series are in other respects such counterparts that if the sex characters permitted, I should conclude *edusa* the male and *Saundersii* the female. But very evidently such is not the case, for both series seem to contain males only.

LUNATA COMPARED WITH THE OTHERS.

Individuals more robust in body than those of the two other series, but as to expanse of wings about the same average.

Of the 42 specimens almost all have the general appearance of females. Of only one or two would there seem any doubt, and even these do not look like males, but their appearance is less conclusive as to their sex. In the other sets the reverse seems the case; all but two or three decidedly appear to be males, and the exceptions do not look like females, but merely have less definite characters.

In color *lunata* contrasts with the others by a more sombre style of decoration.

On under side the markings of the three series agree as to essentials, the difference being in shading, &c. *Edusa* and *Saundersii* are alike, with a moderate range of individual variation. *Lunata* has on an average more distinct markings, varying to partial obsoleteness of the strong lines.

The three forms occur coincidently, the season of chief abundance, as indicated by the dates of my specimens, being from mid-July to about 10th August. A few bright ones show dates during September, others late in October, and one *lunata* November 12th. Of the late flight, part survive winter and are found in June (May more rarely) much worn. No *evident* fresh examples dated earlier than July 15th.

P. S.—On p. 136 see Mr. Grote's correction of p. 89.

A few *lunata* and *Saundersii* taken during the past two weeks (August 11th) tend to confirm the foregoing comments.

CORRESPONDENCE.

BUTTERFLIES ON MARTHAS VINEYARD.

DEAR SIR,—

I have spent the last ten days on this island, at Oak Bluffs, and made several excursions into the back country for a distance of about three miles. I find *C. phleas* the commonest butterfly, seen everywhere, in the town, fields and on the beach. Next to that *Argynnis idalia*, which abounds in old fields, and is just now fresh from chrysalis. Of *P. tharos* I have taken two fresh males, var. *marcia*. *Satyrus alope* male is making its appearance and the species may become quite common. I am not sure that some examples of *nephele* have not been seen also. Another *Satyrus* I saw in the oak woods, but could not determine whether it was *eurytris* or *canthus*. *Philodice* seems rare, and I have seen one example of *antiopa* and one of *atalanta*. No *Hesperians* at all have been seen, and no other butterfly than I have above mentioned. On a ride to Boston I saw a *Terias nicippe* flying near Brockton Station.

W. H. EDWARDS.

July 29th, 1877.

DEAR SIR,—

Perhaps some of the readers of your valuable paper might be interested in knowing of the capture at this place of another superb *Catocala marmorata* Ed., which I took July 2nd. It was sitting on the trunk of a Silver Poplar tree, within a few yards of where I captured one on July 10th, last season. Prof. Wetherby and myself have each taken a single specimen of *Catocala agrippina* Strecker, whose types were from Texas, I believe.

CHARLES DURY.

Avondale, Ham. Co., Ohio, Aug. 15th, 1877.

DEAR SIR,—

On p. 120, vol. ix., CAN. ENT., is published a note by Mr. Robert Bunker, referring to the "effect of hot weather upon certain Sphinges," particularly *P. satellitia*.

I have regularly for several years past taken mature larvæ of *P. achemon* previous to July 10th, the transformation of which, so far as I know, was

completed by Sept. 25th of the same year. This year, although everything is about two weeks behind its usual time, I received two mature larvæ July 5th, both of which had unfortunately been killed ; with them came a moth taken the same day, whose wings had not expanded when discovered.

The time from deposit of egg to pupation is about eight weeks, sometimes a day or two more, but usually three or four days less, hence these ova must have been deposited before May 10th, or before even *Colias philodice* had appeared. As I know of no Sphinges emerging here before the middle of June, the contraction of the time of growth would be very remarkable in this case, even had the weather been hot, which it has not.

I have taken this moth *(P. achemon)* in May, flying about the early spring flowers in company with *Deilephila lineata*, both very ragged and much faded : this would seem to suggest that *P. achemon* (and perhaps other Sphinges) exists as it were in duplicate, the September examples hybernating in the perfect state and depositing ova in the spring. A state of affairs possibly instituted by a long, dry and warm season in summer and autumn, and continuing until a severe winter, destroys the hybernating examples, which must also suffer greatly from mice, and their ova and larvæ from late frosts, thus accounting for their rarity.

This is, I admit, a very weakly supported hypothesis, resting entirely upon circumstantial evidence, as early examples of strong moths like Sphinges *might* travel many miles before a strong south wind ; if, however, some collector who has females emerge in September, would dissect them and ascertain how far the ova are developed, the result would probably offer a satisfactory solution as to the probability of occasional or regular hybernations.

It may be a matter of interest that *Pieris rapæ* has reached this point in its westward journey. I took one ♂ example at Maplewood, immediately west of this city, Sept. 8th ; seemed to be more abundant than *P. protodice*, which was flying in the same locality.

C. E. Worthington, Chicago.

DRYOCAMPA RUBICUNDA (FABR.)

Dear Sir,—

Mr. Linter, in his "Entomological Contributions," No. 3, has a very elaborate description of this larva, noting, indeed, very minute char-

acters and some which are by no means constant, such as the number of spinules on different portions of the body. There are some few words to which exception may be taken; for instance, the color is not always "apple green," being not unfrequently greenish-white, and in such case the lateral stripes are nearly black.

But, speaking generally, the description is very accurate; one important omission has, however, occurred, and it is to this omission I wish to draw attention. I have, from time to time, reared hundreds of these larvæ, and I never saw one that had not a *conspicuous red patch*, with white granulations, on the stigmatal portions of segments 11 and 12. That so careful an observer as Mr. Lintner should have overlooked this mark, had it been present in the specimens he examined, seems improbable; and now the question arises—Has not Mr. Lintner described some species not *rubicunda*?

I urged this consideration on Mr. Lintner some two years since, and sent him a small batch of larvæ for his examination. I think he told me that they all died, and, so far as I know, he has taken no further notice of the matter.

I have an indistinct recollection that some one has recently described a new species of *Dryocampa* allied to *rubicunda*, but do not feel quite sure; but, any way, the questions are important—Did Mr. Lintner describe *D. rubicunda* larva inaccurately? or, Did he describe the larva of a new species? or, Do the larvæ of *rubicunda* vary to the extent of sometimes losing the red patch?

W. V. Andrews, Brooklyn, N. Y.

FOOD PLANTS OF SATURNIA IO.

Dear Sir,—

The larvæ of this species are unusually abundant here this season, and I have taken them feeding on White Birch, Oak, Corn, Willow, Sweet Fern (*Comptonia asplenifolia*), Currant, Apple, Wild Indigo (*Baptisia tinctoria*), Clover, Bush Clover (*Lespedeza*), Snow Berry (*Symphoricarpus*), and the Ash.

L. W. Goodell.

Amherst, Mass., Sept. 1st, 1877.

The Canadian Entomologist.

VOL. IX. LONDON, ONT., OCTOBER, 1877. No. 10

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The seventh annual meeting of the Entomological Society of Ontario was held in London, at the rooms of the Society, on Wednesday evening, September 26th,

The President, W. Saunders, in the chair.

A considerable number of members from various parts of the Province were present; also a fair representation of those resident in the city.

After calling the meeting to order, the President expressed his regret that the Society had during the year lost the valued services of one of its officers. Owing to pressing business engagements, the Secretary-Treasurer, Mr. J. H. McMechan, had found it necessary to resign. Pending the appointment of a successor, Mr. J. Williams had kindly consented to act as Secretary-Treasurer *pro tem.*, and in this capacity had rendered most valuable and timely assistance.

The report of the Treasurer showed a very satisfactory state of the finances, there being a balance to the credit of the Society at the close of the financial year of two hundred and thirty-six dollars.

REPORT OF THE COUNCIL, 1877.

In presenting the seventh annual report, the Council feel highly gratified at the success that has attended the labors of the Society during the past year.

We are happy to note the return of the Society's Centennial collection of insects, which reached London in good condition shortly after the close of the International Exhibition. This collection, which was noticed in your last annual report, is now placed in the Rooms, where it will in future be available for reference. As this beautiful collection was made

up largely from the cabinets of individual members of the Society, who generously loaned the insects for the purpose of exhibition, it was thought that if the immediate return of the loaned specimens was insisted on, the value of the series would be greatly impaired ; but we are happy to state that the parties concerned have in most cases given their consent to allow the specimens to remain on deposit in the Society's Rooms ; so that we still retain the Centennial Collection of Canadian Insects almost intact, a monument to the zeal and industry of those members of the Society who were actively engaged in this work.

We may add that this collection was placed on exhibition at the Rooms on several occasions after its return, when some of the members were present to assist visitors, and from the interest manifested then by the public in the matter, we would recommend that the Rooms be thrown open occasionally to all who may desire to visit them, and that public notice be given of the same.

The CANADIAN ENTOMOLOGIST has almost completed its ninth volume, and fully maintains its reputation as a record of the latest investigations and discoveries in scientific and practical Entomology. We would return our heartiest thanks to all those who have so kindly contributed to the pages of the ENTOMOLOGIST, and request that they will continue to favor the Editor with the results of their observations and experiments. Although we have reason to feel gratified at the efforts of the Society to excite in the general public an interest in Entomology, yet we would respectfully suggest that our successors may be able in some measure to improve on the means adopted in the past to render the ENTOMOLOGIST even more useful to beginners in this interesting science, either by more frequent descriptions and illustrations of our common insects, and perhaps by referring to the insects that are likely to appear in each month of the summer, and the manner of their capture and preservation, or in any other method that may appear suitable.

We are happy to note a steady increase in the number of members. The Branch Societies, especially in London and Montreal, are progressing favorably.

The funds of the Society are in a gratifying state ; by economical management we have been enabled to sustain and successfully carry out all the operations we have undertaken ; for details we refer to the report of the Secretary-Treasurer.

The Library has been enriched by a number of valuable scientific works, and others of more general interest, but which bear on Entomological subjects. Among the additions we may mention the *Encyclopedia Brittanica*, as far as at present published, which will prove invaluable as a means of reference. Our stock of engravings and electrotypes has been slightly increased, but in this line we are greatly restricted by want of means, and are obliged generally to content ourselves with electrotypes of other illustrations. We believe that a much larger sum than is annually given for this purpose might be profitably expended in procuring original illustrations.

Submitted on behalf of the Council by

JOSEPH WILLIAMS, Secretary-Treasurer.

The President then proceeded to deliver his annual address.

ANNUAL ADDRESS OF PRESIDENT.

GENTLEMEN,—At the close of another year it is my duty and privilege to offer you a few remarks relating to our progress as a Society, and also to the general advancement of that department of natural science in which we all feel so deep an interest.

The progress of the Entomological Society of Ontario during the past year has been steady and continuous. Every season witnesses an infusion of new blood into our ranks, mainly from among the young, who, when entering on the pursuit of this charming study, bring with them all the enthusiasm and ardor of youth. Our membership is thus gradually increasing, and our influence and sphere of usefulness yearly extending. The importance of the study of Entomology is gradually becoming more deeply impressed upon the public mind. The Entomologist needs no longer to apologize for the trivial character of his pursuits, for small and apparently insignificant as the operations of the individual destructive insect may appear, yet when multiplied, as they usually are, by millions, their work is so disastrous and so desolating that the study of their life history, with the view of combatting more effectually their enormous increase, becomes of the most vital importance.

We have to note the prevalence during the past year of several insect pests. Early in June our gardens, orchards, and even our forests in the western portion of Ontario were frightfully devastated with the Forest

Tent Caterpillar, *Clisiocampa sylvatica*. There were millions upon millions of them, and so enormous were their numbers, and so persistent their attacks, that after fighting them bravely for a week or two, many gave up the contest in despair, weary of the slaughter. Many an orchard was rendered bare and leafless, and in some instances the woods were so void of foliage as to remind one of winter. This was particularly the case about London, and our orchards and gardens here were saved from destruction only by the most persistent effort. For several weeks caterpillars were swarming everywhere, so that the timid scarcely dared venture out under the shade of trees for fear of bringing them home on their clothing or persons. By the end of June they had nearly all become chrysalids, and it was interesting to observe the strange looking deformities they occasioned among ornamental shrubs and flowers by twisting the leaves into suitable forms in which to enclose their cocoons. On the trees the few fragments of leaves remaining were put to a similar purpose, and thus sewed up and hanging pendant with the weight of sometimes two or three cocoons huddled together, they looked very odd.

On examining a number of these chrysalids, a large proportion of them were found to be infested with parasites, which materially lessens the chances of their being so very numerous again next year; still we fear that enough of them passed safely through all their preparatory stages to give us some trouble another season.

The Cabbage Butterfly, *Pieris rapæ*, is still progressing westward. This year it has extended its domain as far as Chicago, where a few of the advance guard have been captured. In the neighborhood of London their larvæ have been very destructive this summer, so disfiguring and destroying the cabbages in many instances as to render them entirely worthless. The history of the introduction of this pretty little pest forms an interesting chapter in our Entomological annals. During the time of the Trent difficulty in 1861 a quantity of fresh vegetables were sent along with other stores to Quebec for the sustenance of the gallant little army which was despatched to our shores. As the Cabbage Butterfly is said to have made its appearance shortly after this period, it is presumed that it was accidentally introduced with the stores for the troops. In 1863 specimens were sent to us from this district for determination, which was the first intimation we had of their existence in this country. By 1866 the butterfly had spread further west than Montreal, and east as far as the Saguenay River. In 1869 it was reported as common in New Jersey, and

by 1871 it had travelled east as far as Halifax, Nova Scotia, and west to the middle of the State of New York. It now embraces an area bounded by the shores of the Atlantic from the River St. Lawrence to Virginia, and has overrun the whole country westward as far as Chicago. A few days since, while on a visit to the Muskoka District, I was surprised to find them plentiful, in company with the Colorado Potato Beetle, as far north as the head of Lake Rosseau.

The wonderful manner in which this insect has adapted itself to the varying climatic characteristics embraced within this wide area, is a matter of astonishment. It seems to thrive alike in the cold north and sunny south, and in every place where it establishes itself it has multiplied so rapidly as to become in a very short time the commonest of all butterflies. The little parasite. *Pteromalus puparum*, which has also fortunately been introduced from Europe, and which is finally destined to keep this pest within reasonable bounds, is on the increase here, but is not yet sufficiently numerous to fulfil its mission as successfully as we could wish.

The Colorado Potato Beetle, as predicted, has at last found its way across the Atlantic, and founded colonies on the Continent and in the British Isles. Their arrival and settlement has caused a commotion almost as great as would the approach of a hostile army. According to newspaper accounts, large patches of ground where the enemy has been seen lurking have been saturated with benzine and fired, while in the search the whole surface has been turned over with the spade and shovel as carefully as if each specimen were a nugget of gold or a diamond. Cargoes of all sorts in which it was suspected the intruders could find a hiding place have been submitted to the most rigid examination by government officials, and various edicts were promulgated, with a view to strangle this evil in its infancy ; but the beetle is heedless of enactments, however prohibitory, and we fear that no vigilance, no matter how persistent, will avail in preventing the spread of this little intruder, and that before long the potato grower in Europe will be obliged to regularly adopt measures for poisoning this pest similar to those so successfully carried out by our own people.

Since I was last privileged to address you the Congress of the United States, in view of the enormous losses yearly inflicted on agriculture by destructive insects, have appointed an Entomological Commission composed of eminent Entomologists, who shall devote their whole time for several years to a study of the habits of the various insect pests and the

thorough testing of the efficiency of such remedies as have been or may be devised for their destruction, and to report progress from time to time. A liberal appropriation to defray the expense of this work has been made, and the laborers are now actively engaged in the field.

Early in the year your President was requested by the Chief of this Commission, Prof. C. V. Riley, to bring this important matter before our Government and ask their influence towards furthering the objects in view. Accordingly, at a meeting of the Council of Agriculture, held in June last, the writer introduced a resolution urging the co-operation of our Government with that of the United States in this undertaking, which was unanimously adopted by the Board and transmitted to the proper authorities. I am pleased to be able to state that the Minister of Agriculture, in his reply, assured us that this subject had already engaged their serious attention, and that every effort would be made to aid the Commission in its work. This season is being spent by these savans in especially studying the habits and breeding places of the destructive Locust of the West, and already they have made extended observations, not only in the western territories of the United States, but also in some of the adjoining portions of our Dominion.

The Entomological Club of the American Association for the Advancement of Science held its annual meeting in Nashville, Tenn., commencing on the 30th of August, when many interesting subjects were discussed. An important paper was read by A. R. Grote, Esq., of Buffalo, N. Y., on a new insect destructive to the red and white pine trees, the sources of our valuable lumber trade. From the details given of the work of this insect we fear it may prove a formidable foe to the future growth of our pine forests. Our Society has usually been represented at these annual gatherings, but on this occasion, owing to other pressing and unavoidable engagements, those of us who have usually attended were prevented from being present.

We cannot better illustrate the recent progress made in Entomological science than by referring to one department, namely, that of the study of our night-flying moths. This has been greatly stimulated by the general practice of sugaring, by which immense numbers of these insects have been attracted, and their capture in good condition made an easy matter. This practice in America was but little followed until 1874, when an English Entomologist, Mr. George Norman, visited Canada, and, after having faithfully carried on the process of sugaring for a season, he pub-

lished the results of his labors and his mode of operating in our journal. His success was so unprecedented, and so many rare or hitherto unknown species captured, that collectors everywhere were induced to imitate his example, and in the short time that has since elapsed an immense number has been added to the list of known species, and our collections have been enriched by this means with an extensive series of hitherto rare specimens.

Our monthly journal, the CANADIAN ENTOMOLOGIST, is still well sustained, its pages being regularly filled with interesting and original contributions. Did time permit, I might have occupied your attention at considerable length by referring to the many valuable points brought out in these papers. I cannot, however, refrain from adverting to the contributions of Mr. W. H. Edwards, of West Virginia, on the life history of some of our butterflies, in which it has been shown that not a few of our so-called species are merely dimorphic forms of other species, and attention drawn to the important influence of cold in modifying these forms. By exposing the chrysalids to the influence of this agency by laying them for varying periods on ice, or placing them in an ice house, some of these dimorphic forms have been produced at will, thus throwing much light on the causes of variation in species.

I would also call your attention to the many recent valuable additions to Entomological literature in America, especially to the beautifully illustrated work of Dr. A. S. Packard on the Geometrids of North America; to the continuation of Edwards' magnificent work on North American Butterflies; to the learned and elaborate treatise on the Ryncophora of America north of Mexico, by Drs. LeConte and Horn; to the excellent works of Prof. Townend Glover, of Washington, on American Diptera, Orthoptera and Hemiptera; to the valuable reports of the State Entomologist of Missouri, and many other excellent works. But I must not trespass longer on your patience. Thanking you for your kind partiality in honoring me as you have done, I have the honor to be

Yours very sincerely,

WM. SAUNDERS.

London, Ontario, September 25th, 1877.

The election of officers then took place, with the following results:

President: W. Saunders, London.

Vice-President: E. Baynes Reed, London.

Secretary-Treasurer: J. Williams, London.

Council: Wm. Couper, Montreal; Rev. C. J. S. Bethune, Port Hope; J. Pettit, Grimsby; J. M. Denton, London; Rev. R. Burnet, London; R. V. Rogers, Kingston; Jas. Fletcher, Ottawa.

Editor of CANADIAN ENTOMOLOGIST: W. Saunders, London.

Editing Committee: Rev. C. J. S. Bethune, Port Hope; E. B. Reed, London, and G. J. Bowles, Montreal.

Library Committee: The President, Vice-President, Sec'y-Treasurer and J. M. Denton.

Auditors: Chas. Chapman and A. Puddicombe, of London.

During the time allotted for miscellaneous business, Mr. D. W. Beadle, of St. Catharines, spoke of the ravages of the Cabbage Butterfly, *Pieris rapæ*, and of the great benefit that would be conferred on gardeners by the discovery of some remedy which might be safely used for this pest. He also referred at length to the great success which had attended the labors of the Entomological Society, and of the high reputation it had acquired in America and foreign countries.

Mr. P. C. Dempsey, of Alboro, stated that hot water had been successfully used in his neighborhood to destroy the *Pieris* larva; that experiment had shown that the cabbage would bear the application of water heated to 200° Fahrenheit, without injury, while water at a somewhat lower temperature than this would effectually destroy the larva. The hot water may be applied through a rose sprinkler or by the use of a dipper. He also stated that a cold infusion of Quassia in the proportion of two or three pounds to a barrel of water had been found effectual in destroying the worm, and more convenient in its application than hot water. This solution may give a slightly bitter taste to the vegetable unless thoroughly washed, but it is perfectly harmless to the human system.

Mr. Chas. Arnold, of Paris, referred to the increasing ravages of the Codling Worm (*Carpocapsa pomonella*), and stated that he had scarcely a sound apple in his orchard this year. This was doubtless partially due to the small crop, and he hoped that the scarcity of apples this season would so far starve out this insect that we might enjoy some immunity from its attacks for a year or two.

Rev. Dr. Burnet, President of the Fruit Growers' Association, expressed his pleasure at being present, and his high appreciation of the labors of the active members of the Society, and referred to the great benefits which

fruit growers had derived from the publication of the results of their investigations on noxious insects injurious to fruits.

Prof. Buckland, of the Department of Agriculture, Toronto, spoke of the great utility of the work carried on by the Society in diffusing information in reference to the various insect pests which afflict the farmer and fruit grower, and of the flattering notices he had seen in foreign journals concerning the CANADIAN ENTOMOLOGIST. He believed the Society well deserved the cordial support of all those interested in agriculture.

DESCRIPTIONS OF NEW SPECIES OF BUTTERFLIES BELONGING TO THE N. AMERICAN FAUNA.

BY W. H. EDWARDS, COALBURGH, W. VA.

Melitaea ulrica.

Male—Expands .85 inch.

Upper side black, marked and spotted with deep red fulvous, much as in *P. vesta;* both wings have a submarginal series of small crescents, the one on middle of primaries considerably larger than any other ; on primaries this series is preceded by a sinuous row of small spots, and next by a bent row of larger ones ; a fourth row curves round the end of the cell, and there are some spots in and below cell. Secondaries have two rows of irregular small spots across the extra discal area, and across the disk a broad band ; some spots in cell and on basal area ; fringes fuscous alternating with white.

Under side of primaries black over the outer fourth ; next the margin a narrow band made up of confluent fulvous spots, and immediately beyond this is a series of small white spots, corresponding with the submarginal series on upper side, the middle one long, lanceolate, and a similar one at apex, but somewhat smaller ; the second row of upper side is repeated, but beyond this to base the ground is mostly fulvous, representing the spots of upper side, but now enlarged and mostly confluent ; secondaries have a marginal band like that of primaries, followed by a complete series of large white spots, crenated, or the middle ones almost

lanceolate; above these the area is black, and in this is a row of small rounded fulvous spots stopping a little before the costal margin; across the disk a row of white points and a continuous white band; beyond to base fulvous on black ground, but with a white spot in cell, and a band near base, and one directly at base.

Body above black, with fulvous hairs; beneath cinereous; legs cinereous, fulvous in front; palpi yellow-fulvous in front, white at base; antennæ black annulated with white; club black, fulvous at tip.

Female—Expands .9 inch. Scarcely differs except that the fulvous is paler.

From 4 ♂, 2 ♀, taken by Mr. Z. Boll, at San Antonio, Texas. On the under side this small species much resembles *Mel. Gabbii* in general appearance; the wings are narrow, and primaries much produced. It belongs to Group II of my Catalogue.

Melitaea dymas.

Male—Expands .95 inch.

Upper side brownish-black, marked and spotted with orange-fulvous; primaries have a submarginal row of rounded spots, obsolete on apical half; both wings crossed on the extra discal areas by a common band of separated spots, mostly sub-quadrate, bent opposite the cell of each wing and almost at a right angle on secondaries; primaries have five spots on cell, filling it, except as they are separated by black lines; and several small spots at end of and below cell; secondaries have the basal area nearly all fulvous, leaving a broad belt of black between this area and the extra discal band; in the cell a subovate black spot with fulvous stripe in middle; on the black belt in the several interspaces are a few fulvous scales; fringes of primaries fuscous, with a little white at intervals, and the apex wholly white; of secondaries fuscous only.

Under side of primaries has the margin bordered by a confluent band of crenated spots, and before this is a row of narrow dull white lunate spots, or in part lanceolate, stopping at second branch of median; these stand upon a narrow black belt; beyond to base the ground is orange fulvous, with four transverse black lines in cell, a curved row of rounded black spots outside cell, and an indistinct black line across the disk. Secondaries have the marginal series dull white on black ground, and next preceding an orange-fulvous band, and then a broad dull white band cut

beyond the middle by a black stripe from outer to inner margin; the basal area, including the cell, orange, except a triangular white spot in cell, edged with black, and a white transverse band similarly edged; along the inner margin this band is joined to the discal white band.

Body above color of wings, beneath gray-white and black; legs black and white, fulvous in front; palpi fulvous with black hairs, white at base; antennæ fuscous annulated with white; club black.

Female—Expands .95 to 1 inch.

Upper side uniform yellow-fulvous; a white patch on edge of costa of primaries two-thirds the distance from base is limited by the subcostal; hind margins of both wings edged with black, broadest at apex of primaries and along the middle of secondaries; on this rests a common series of spots, color of the ground, mostly crenated, and bordered above by a crenated black stripe; the disks are crossed by two black stripes, the outermost on primaries being nearly parallel to hind margin and not distinct, the other bent round end of cell; on secondaries these are obsolete; in cell of primaries four transverse, rather wavy lines, and a slight mark near base; two similar lines below cell; secondaries have in and below cell very similar lines, but more or less obsolete.

Under side nearly as in male, the only difference being in the paleness of the ground and the obsoleteness of the black markings on primaries.

From 1 ♂, 3 ♀, also sent me by Mr. Boll, and taken at San Antonio, Texas. I sent one example of each of these species to Mr. A. G. Butler, British Museum, to ask if they had been described as Mexican. Mr. Butler regards them as hitherto undescribed. The wings of *dymas* are narrow, primaries much produced. There is a remarkable difference between the sexes on upper side, but below the markings are almost identical. It is the opinion of Mr. Boll that these constitute but one species. This species belongs to Group III of my Catalogue.

Amblyscirtes nysa.

Female—Expands 1.1 inch.

Upper side glossy dark brown; primaries have three small transparent spots forming a curve, on costal margin, at three-fourths the distance from base, and a point on the disk: fringes long, fuscous next the margins, but anterior mixed with white.

Under side of primaries a little paler, the spots repeated, the discal spot more distinct; secondaries brown clouded with blackish, a dark illy-defined band following the hind margin, a patch on disk and another on costal margin; also dark at base; some gray scales forming patches border the darker portions near outer angle, and there are others on the median interspaces. Body dark brown; below, thorax yellow-white and cinereous, the abdomen gray-brown; palpi yellow-white; antennæ fuscous above, annulated with gray-white, gray-white below; club black. From two examples, sent me by Mr. Boll, the other by Mr. Belfrage, and taken in Texas.

Pholisora nessus.

Male—Expands 1.1 inch.

Upper side light brown; a black band crosses the extra discal area of both wings, formed by short longitudinal stripes, one on each interspace; and a narrower band, more confluent, crosses the disk of primaries and basal area of secondaries; along the hind margins is a dash of gray in each interspace, not distinct; primaries have three transparent spots on costal margin at end of the fold, and three others half way beyond to apex; and on middle of disk are two marks forming a V-shaped spot, not quite joined at the angle; secondaries have a similar small spot near outer angle and two on the disk; fringes long, fuscous, with a few gray hairs.

Under side lighter brown, clouded much as above; the spots repeated. Body dark brown; palpi white; antennæ fuscous annulated with gray white; club black.

Female—Expands 1 inch.

Similarly marked, the colors lighter, especially on under side.

From 2 ♂, 1 ♀, received from Mr. Boll, taken at San Antonio, Texas. Mr. Meske also has this species from Bastrop, Texas.

ON THE BLACK-WING GROUP OF THE GENUS CATOCALA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

The "species" of the black-winged group (*Mormonia* of Hübner) comprised in the genus *Catocala* have been largely augmented as the

collections are increased throughout the country. Without doubt, when we shall be thoroughly conversant with the immature stages, our knowledge of the species will be more perfect. Our collections containing only the perfect stages, the forms are clearly recognizable. Mr. Grote has recently arranged the species of this group in the Collection of the Buffalo Society of Natural Sciences as follows, and a species named for the first time is contained therein. The following classification contains our North American species, one of which *(sappho)* is unknown to me.

Gen. Catocala Schrank.

Group I, Mormonia Hübner.

Sub-group I (fringe of secondaries white).

1. C. epione *Drury.*
2. C. lacrymosa *Guen.*
3. C. sappho *Strecker.*
4. C. subviridis *Harvey.*
5. C. agrippina *Strecker.*
6. C. viduata *Guen.*
7. C. desperata *Guen.*
8. C. retecta *Grote.*
9. C. flebilis *Grote.*
10. C. ulalume *Strecker.*
11. C. Robinsonii *Grote.*
12. C. obscura *Strecker.*
13. C. simulatilis *Grote.*

Sub-group II (fringe of secondaries blackish).

14. C. Levettei *Grote.*
    Syn. *C. judith* Strecker.
15. C. Angusi *Grote.*
16. C. residua *Grote.*
17. C. insolabilis *Guen.*
18. C. tristis *W. H. Edw.*

It would seem best to follow this arrangement of the species. In the second sub-group the apices of secondaries are not touched with white or scarcely so in *Levettei.* In *tristis* the white apical patch is quite evident.

C. subviridis, n. s.

♂. Allied to *agrippina.* Differing by the fore wings being shaded with dark silky green. Lines black, evident, accompanied by white scales, evident on internal margin. The brown shades of *agrippina* are wanting. Sub-reniform, detached, small; subterminal line white and rather evident. Beneath like *agrippina*, but the white bands are narrower.

Expanse 3⅛ inch. Habitat, Dallas Co., Texas, Boll Coll. One specimen. Possibly figured as a var. of *agrippina* by Strecker.

C. residua, var.

♂. A remarkable aberration of this species is represented in the Collection by a specimen which has the left hind wing smaller and beneath hoary at base without the band. Fore wings with the t. p. line thrown out of position, back towards base of wing and aberrant in its course. Thorax rusty. Habitat, New York.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

GRACILARIA.

G. fasciella Cham.

G. 5-notella Cham.

With ten specimens of *fasciella* and two of *5-notella* before me, with scarcely a trace of variation in the ten, but with the two differing from each other somewhat and both differing very decidedly from the ten, I had no doubt as to the distinctness of the two species. A larger series, however, induces the belief that they belong to the same species. The difference between them may be thus stated: In *fasciella* the base and apex of the fore wings are brownish-gray, and between these portions are three brownish-gray and four white fasciæ, all very distinct and well defined. In *5-notella* the whole dorsal half of the wing is white, there is a small brown spot on the base of the costal margin, another further back, and still further back another which in the middle of the wing is produced backwards to the gray-brown apical part of the wing, which encloses two small white costal streaks. A larger series, however, shows that the two forms vary into each other and induce the suspicion that Dr. Clemens described his *G. fulgidella* from a form like *5-notella*. The tuft on the second joint of the palpi is minute, and in all of my specimens but two it has been removed in pinning.

G. Packardella Cham.

In this species there is great range in the intensity of the purplish tinge. Some specimens might be described as having it so strongly developed as to ally them to *purpuriella*, *stigmatella*, &c., while in others

it is very faint and delicate, the ground color of lemon yellow not being at all obscured by it. It is, however, allied to *superbifrontella* and *Severderella*, &c., more closely than to any other known species.

G. inornatella Cham.

This must be dropped from the list, as I am satisfied that it was described from worn specimens of *G. Packardella* and *superbifrontella*.

G. purpuriella Cham.

Since the last notice of this species was written I have bred it from larvæ feeding on the silver-leaf poplar ; but I have never met with it on the weeping willow, though it is common enough on many of our native willows. It may prove to be the European *G. stigmatella*, which feeds on sallows. It is certainly very near that species.

ANTISPILA.

A. ampelopsiella Cham.

In Vol. 6 I have given this name to a mine and larva found in leaves of *Ampelopsis quinquefolia*, the imago being then unknown. I have also *loc. cit.* described a species bred from grape leaves, without naming it, because I thought it probable that it would prove to be *ampelopsiella*. Since then I have bred it both from *Ampelopsis* and from wild grape leaves *(Vitis cordifolia)*, and it proves to be the same species described in Vol. 6. The description, however, is imperfect, having been prepared from a single slightly worn specimen.

A. hydrangeæella Cham.

This species was also named from the larva and mine only. I have since bred it. It is a little larger than *ampelopsiella*, though scarcely so large as *isabella* or *viticordifoliella*, and is perhaps the prettiest species of the genus. The palpi and tips of the antennæ (last five joints), and the under side of a few of the basal joints snowy white. Head, thorax, abdomen, inner surface of legs, hind femora and tibial spurs of hind legs like burnished steel ; tarsi of anterior and middle legs and tips of hind tarsi yellowish white, posterior tibia on outer surface and tarsi, except the tips, purplish, with metallic reflections. Anterior wings and a spot on each side of the thorax bronzy brown, without greenish reflections ; ciliæ

purple, tipped with silvery gray. The fascia, costal and dorsal streaks and apical spot are brilliant silvery; the fascia is not constricted on the fold and the streaks are placed as in the other species; the costal spot is small and the dorsal large and almost an exact triangle, being, however, a little wider on the base and the margins very faintly concave. Hind wings and ciliæ pale purplish fuscous.

It thus differs from *ampelopsiella* in having the tips of the antennæ white and in other minute particulars. The case in which it pupates is elongate and narrow, a long ellipse; that of *ampelopsiella* is a short and wider elipse, that of *viticordifoliella* is nearly oval, that of *isabella* a very wide oval, almost circular, and that of *cornifoliella* is smaller than that of *isabella*, though resembling it more in shape than that of *viticordifoliella*, which is nearer to it in size. That of *nyssæfoliella* I have not seen. It requires careful observation to distinguish the species. They are more readily distinguished by their cases than by the markings of the imago. *Hydrangeæella* and *ampelopsiella* may be distinguished at once from the others by the possession of the apical spot, but they require close observation to distinguish them from each other. So likewise do *isabella*, *nyssæfoliella*, *cornifoliella* and *viticordifoliella*. *Cornifoliella* and *isabella* are, however, of a duller, darker brown than the other two, and *viticordifoliella* likewise has white annulations towards the tips of the antennæ.

I have not seen any of the European species, but comparing our species with the figures of *Pfeifferella* and *Treitschkiella* in Nat. His. Tin., vii., the latter are much paler or lighter in color than our species.

NOTES ON NOCTUIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Chytonix palliatricula.

This species has the thoracic vestiture mixed with hair-like scales, and it agrees in all respects with *C. iaspis* as to structure and pattern of ornamentation. It differs from *Bryophila lepidula* in these respects and in that the abdomen is more strongly tufted. I have taken all these species in June and July in the vicinity of Buffalo.

Hadena quaesita.

Prof. Lintner's remarks in letters on the variability of *lignicolor* and his doubt, after seeing my type, of the validity of *quaesita*, induced me to take a large number of specimens this season; and though I have not taken one exactly like *quaesita*, I have a series which approach it so closely that I think it now only a pronounced example of that form of *lignicolor* which has the ground color of primaries very pale. The reddish tint is decidedly absent and the dark shades on terminal space and elsewhere contrast more strongly. The slight differences in the lines and stigmata are, I am satisfied, only varietal. The name *quaesita* applies then to the dark brown and pale form of *lignicolor*.

Hadena delicata.

I have taken a few fresh specimens of this species near Buffalo in June and July. The deep green shading is very beautiful and distinct on the thorax, base of the wing and to the subterminal line. I have since referred *H. interna* to this species, the type exhibiting the principal features of *delicata*, especially the inferior sinus of the subterminal line, but showing no green shades whatever, though comparatively fresh.

Mamestra vicina.

I have taken several specimens of this species near Buffalo, in July. I cannot separate satisfactorily from this species certain Texan specimens which I suppose to be the *teligera* of Mr. Morrison. The ovipositor is extended in one Texan ♀, in another not visible. I do not see it externally in *vicina*. Its visibility does not seem to me a satisfactory generic character, and in the series of *grandis*, *subjuncta*, *atlantica*, *vicina*, I would include the Californian *Mamestra pensilis*, formerly referred by me to *Dianthoecia*, but apparently representing *vicina* in the western district.

Pallachira, n. g.

♂. Antennæ scaled on their upper surface with long setose pectinations outwardly; on the inside the processes are short, and from base to basal third much reduced; at this point the inner series is interrupted by a stouter claw-like process. Ocelli present; eyes naked; squamation scaly and thin. Legs slender, closely scaled, unarmed; hind tibiæ with two pair of spurs. Fore feet long and with the terminal joints tufted. Body slender; wings ample; abdomen exceeding secondaries.

I refer this genus to the Deltoids near *Herminia*. My single specimen in good condition has the fore feet so tufted that I cannot make out satisfactorily the form of the tibiæ and tarsi; they seem to be aborted.

Pallachira bivittata, n. s.

Entirely pale ochrey, powdered with fuscous. A broad fuscous stripe below median vein from base to external margin. A second shorter stripe from the extremity of the cell outwardly. Else the entire insect is concolorous. *Expanse* 25 mil. Buffalo, July, coll. auct. The fore wings recall in color those of *Arsilonche Henrici*.

Agrotis trabalis, n. s.

♀. Fore tibiæ unarmed; middle and hind pair spinose. Eyes naked. Thorax with a small tuft behind the collar; behind with a divided tuftlet. Abdomen a little flattened, carinated, with a tuft on basal segment. Wings ample; form rather stout. Whitish gray with large stigmata and bright brown contrasting subterminal space. A basal black dash, a second above it on the cell, before the orbicular, which latter is near the t. a. line, inaugurated above it on costa by two black lines rather wide apart, with white included space. Below the t. a. line is twice waved to internal margin. Basal space whitish; basal line indicated. Sub-basal space dark gray. Stigmata concolorous, ringed with black, very large. Claviform incomplete; orbicular a little flattened, ovate; reniform moderately excavate. T. p. line narrow, geminate, regularly and slightly scalloped, with a deeper incision opposite the cell. Subterminal space rather wide, bright brown; s. t. line faint, pale; terminal space rather narrow, dark gray. A dentate black continuous terminal line. Hind wings pale gray fuscous, with pale fringes touched with blackish at extremity of veins; a black terminal line. Beneath pale, powdered with dark scales; an indistinct common outer line; discal lunule filled in and prominent on hind wings, empty on primaries. Abdomen pale; thorax gray, darker shaded on tegulæ. Second palpal joint outwardly black. Front white inferiorly below a frontal black line. The collar has no transverse black line, but is tipped with a darker shade. *Expanse* 42 mil. Mass. (Roland Thaxter).

A second specimen in poor condition, from Montreal (Couper), has the wings more obscure, the brown subterminal space improminent. In the type there is merely a black line inferiorly connecting the stigmata along the median vein. In the Canadian specimen the orbicular and reni-

form are connected also superiorly with a black line. The lunate discal mark beneath on hind wings is blackish, distinct and large; on the primaries empty in both specimens. The common exterior shade line on the primaries is even, on hind wings irregular.

Somewhat resembles the description of *A. fernaldi*, Morrison, but the fore tibiæ are unarmed. Mr. Thaxter describes the type as from a "cocoon found under pine bark in April, when the larva had not yet become pupa. The cocoon was tough, not unlike that of *cerura*. Larva dull white with blackish markings."

Dryobota stigmata Grote.

♂. Larger than *mactata*, which it resembles in ornamentation. Eyes naked, tibiæ unarmed, abdomen tufted along the dorsum. Antennæ bipectinate, the pectinations gradually decreasing to the tips. Blackish brown tinged with olivaceous, especially on the subterminal space, and bright brown on the median space below the median vein. Lines black, narrow. Sub-basal space wide. T. a. line arcuate. Orbicular large, concolorous. Reniform large, white, with a green stain. Median lines approximate below the middle and connected on the submedian interspace by a black dash. The reddish brown stain extends between the stigmata and colors the linear irregular median shade. T. p. line dentate superiorly, below vein 3 inwardly arcuate, and here touched outwardly with white. The light green subterminal shading stretches to apices, leaving the costal region of s. t. space dark with white dots. S. t. line faint. A terminal series of cuneate black marks. Hind wings fuscous with mesial line and pale transverse shades, reflecting the large filled dark lunate discal mark from beneath. Beneath pale fuscous, veins darker marked; on primaries the discal mark empty; three costo-apical white dots. Abdomen at the sides with reddish tuftings. Collar with a black line. Pectus purplish. Head and thorax somewhat olivaceous, the latter dark behind. Abdominal tufts blackish. *Expanse* 38 mil. Hab. Mass. (Thaxter).

The type has but little of the olive tints of this specimen, but it is not fresh; the markings are similar and I have no doubt it is the same species.

Caradrina bilunata, *n. s.*

♂. Wings ample. Eyes naked, body untufted. Body and fore wings pale mouse gray with distinct black lunate spot; other stigmata obsolete. Lines faint, wide apart, blackish, approximate at internal margin. Sub-

terminal space a little darker ; s. t. line indistinct. Hind wings white, a little soiled exteriorly. Beneath with distinct black dots on both wings. *Expanse* 30 mil. Hab. Newtonville, Mass., August (Thaxter).

This species is almost unicolorous pale mouse gray, with white hind wings and distinct black discal marks.

CORRESPONDENCE.

DEAR SIR,—

What is the nature and cause of the seeming growth on the eye of *P. philenor* and perhaps other butterflies ? I have noticed in examining about 100 specimens of *philenor* that fully one third of the number have on the eye near the proboscis a cluster of yellow tubes, varying from 3 to 40, and from one-twentieth to one-fourth of an inch in length. They are slender, about the diameter of a small insect pin, and are terminated by a mouth or cup-shaped appendage. I have found them in a few cases on *P. glaucus*, but never on any others. If you can not answer, I would be glad if one of your many subscribers would do so, and also give me the name of any work that may mention the peculiarity.

During a trip this summer I succeeded in obtaining several fine *Argynnis diana* females and a few males. For some reason the male was exceedingly scarce, though I saw quite a number of females, which had not as yet laid their eggs. In crossing the mountains (the line between N. Carolina and Tennessee) I noticed that *Neonympha areolatus* was quite abundant in the valleys along the creeks, while *N. gemma* was found in any numbers above an altitude of 1,000 to 1,500 feet.

Lycaena comyntas with us lays its eggs on Rag-weed, the common garden nuisance. I found one doing so about six weeks ago ; there was white clover within five inches of where she was.

EUGENE M. AARON.

Maryville, East Tennessee, Sept. 12th, 1877.

[Can any of our readers throw any light on the question propounded by our correspondent regarding *P. philenor* ?—ED. C. E.]

The Canadian Entomologist.

VOL. IX. LONDON, ONT., NOVEMBER, 1877. No. 11

PIERIS VERNALIS A VARIETY OF PIERIS PROTODICE.

BY THOS. E. BEAN, GALENA, ILLINOIS.

Experiments and observations during 1874–5, supplemented by comparison of a large suite of specimens, seemed to invalidate the specific separation of *vernalis*. Submitting the facts to Mr. W. H. Edwards, he confirmed my opinion, and in the recently issued "Catalogue of the Diurnal Lepidoptera of America North of Mexico," he has placed "*vernalis*" as a variety of *P. protodice*.

The basis for my conclusion is briefly as below :

1. A BROOD FROM PROTODICE.

♀ taken August 15th, 1874. A *protodice* of normal summer form ; being of large size, with ample and dark markings on upper surface of wings and gray scales at base of primaries above, and showing yellowish and rather meagre shading beneath secondaries. This deposited eggs 21st August, which produced larvæ on 25th. Resulting imagines, seven, Sept. 15th. Two of these were not noticeably variant from usual *protodice ;* the remaining five were grades between *protodice* and *vernalis*, one female and four males ; the female and three males approximated *protodice* in varying degrees, and one male was nearer *vernalis* than *protodice* in size and marking.

2. A SERIES FROM COLLECTED LARVÆ.

In 1874, late in September and early in October, a large number of the caterpillars in various sizes were taken from naturalized mustard.

These were brought to the pupa stage with very slight loss, during October and early in November.

No parasites were observed in any stage.

The chrysalids were wintered in a cool room, with but little mortality.*

Imagines appeared 1875, April 14th to May 19th, females more abundant than males, about two to one.

None of either sex were of full size of *largest* captured examples of *protodice*, though several were but little inferior.

The series included scarcely a half dozen of the extreme *vernalis* type, and about an equal number of pronounced *protodice;* between these extremes ranged the large majority of the series, exhibiting a progressive set of intergrades. The prevailing tendency among the grades was towards *vernalis*.

Gradation occurred in regard to every observable point of difference between *protodice* and *vernalis*.

The larvæ from which this series resulted were all practically alike in markings ; if any difference it was not perceptible. This larval uniformity seemed to affirm the specific unity of the diverse forms resulting— a conclusion much strengthened by the numerous intergrades.

3. COMPARISON OF CAPTURED SPECIMENS.

My collected set consists of *protodice* chiefly, a less number which are grades, and a very few of the *vernalis* type ; the intergrades are amply sufficient to connect the extreme forms.

The butterfly is very rare in spring. About mid-June a few may be seen, a larger brood in July, and an abundant flight in August and September. After the middle of August usually the sequency of broods is more or less obscured, as each successive week shows an increased army of individuals ; in scarce years, however, the regular accession of broods is evident.

Captures during June, July, August and early September are almost invariably true *protodice*. In September some grades appear, and with

* The favorable result of this experiment—say 67 butterflies from about 80 larvæ —as compared with the uniform extreme scarcity of *protodice* here in spring in state of nature, suggests that the species is imperfectly inured to our climate, and finds its proper *winter* conditions further south. Out of doors very few of the pupæ seem to escape our severe winters. The butterfly is extremely rare in spring (May), becomes more frequent by July, common and abundant in succeeding months. I have reason to think neither larva nor imago hybernate in this locality.

cool weather a very few *vernalis* also—these in late September and in October until severe night frosts occur. In autumn the grades of earlier dates are nearer the type: those appearing later progressively approach *vernalis*.

I would suggest that the term "dimorphic variety" hardly applies properly to *vernalis*. The variation is multiform, and the intergrade examples largely outnumber the instances of the extreme "*vernalis*" type as described and figured. *Vernalis* is not a variety abruptly contrasting with a type form, but merely the extreme term of a series of variations departing from type.

Vol. I of Mr. Edwards' "Butterflies of N. A." contains plate with accurate and beautiful figures of *vernalis*.

AN ACCOUNT OF SOME FARTHER EXPERIMENTS UPON THE EFFECT OF COLD IN CHANGING THE FORM OF CERTAIN BUTTERFLIES.

BY W. H. EDWARDS, COALBURGH, W. VA.

In May, of the present year, at Coalburgh, I bred a large number of larvæ from eggs laid by *tharos*, var. *marcia*; also several from eggs laid by *ajax*, var. *Walshii*; and from eggs laid by *Lyc. pseudargiolus*; and all of the chrysalids of *tharos*, and part of those of the other two species, were placed in small tin boxes as they formed, and at different intervals thereafter, 10, 20, 60 minutes up to some hours, and one and two days, were laid in the ice box on top of the ice. The box was supplied with ice once a day. I intended removing the chrysalids at irregular periods, so as to see what length of exposure to cold would suffice to change the form of the butterfly, and hoped also to ascertain how soon after the forming of the chrysalis the cold must be applied to produce the desired effect. But the *tharos* chrysalids had scarcely begun to form when I was called to New York, and had to leave charge of them and the larvæ to a member of my family, who followed my directions faithfully as to

placing the chrysalids on the ice at regular intervals. On my return some had been exposed ten days, others but one or two, and I at once removed them and waited to see the result. After six or seven days (which is the usual period of the chrysalis of this species in midsummer), the *tharos* butterflies began to emerge, and as one after another came out quite unchanged, I found that the experiment with them was a failure. A week later the *ajax* chrysalids began to give butterflies, and as they had been exposed to cold some days before I left home, and while I was attending to the ice box myself, the result was better. Some were fully changed, var. *telamonides* emerging instead of *marcellus*, as would have been the case in nature ; others were but partially changed, having the shape of *marcellus*, but the broad crimson anal band of *telamonides ;* and others were not changed at all, but emerged *marcellus*.

Later, one butterfly only emerged from the chrysalids of *pseudargiolus*, a female, and it differs curiously from the type, and from other examples of the same brood which have emerged from the chrysalids not exposed to cold, in that the common series of extra discal spots on under side is wholly wanting, and the marginal crescents form a complete series across both wings and are very large and black, so that these crescents are more conspicuous than in any example I ever saw in the field. The other chrysalids are most of them alive, but the butterflies will not appear before next spring.

The failure of the *tharos* to change led me to test the ice box, and I found that as the ice melted the temperature rose from 45° to 55° in the top of the box. Very likely, also, in my absence, the cover had sometimes been left raised in such a way as to admit air.

Fortunately I had brought back from New York another batch of *tharos* eggs, also of var. *marcia*, obtained in the Catskills, and the larvæ from these I bred in June and July, and placed the chrysalids in the ice box at intervals as before, but this time at the bottom, under the ice, where I found the temperature to be 33°. I had scarcely gotten the last chrysalids in when I was compelled to go East again, and so lost the opportunity of determining the length of time required to effect a change of form, and being detained by the late railroad troubles, I did not return till twenty days had passed. The same day I removed all the tin boxes from the ice. They contained more or less water, and in some was enough to drown the chrysalids.

I divided the chrysalids into three lots. No. 1 contained all which

were exposed to cold at from 1 to 9 hours after forming. No. 2 all at from 30 to 60 minutes after forming. No. 3 at from 10 to 30 minutes. But I discovered afterwards, by a label, that in this last lot were three chrysalids which had not been exposed till two days after forming.

The butterflies began to emerge on the seventh day, and by the ninth all had emerged that were alive. Fully one-half of the chrysalids were either dead or had just life enough to allow the bursting of the case without any expansion of the wings; and of the butterflies several were cripples. No doubt this loss and maiming was in part owing to the water in the boxes, but I think more largely to the tender age of the chrysalids when exposed, their surfaces yet unhardened being liable to injury. But the general result was satisfactory.

Of lot 1 (exposure 1 to 9 hours after forming) there emerged 9 perfect butterflies, 5 ♂, 4 ♀, every one changed. The males were what I call var. D of *marcia*, and though varying much in their under surfaces, were all like examples of the over-wintering brood *(marcia)* taken in the Catskills. Of the 4 females, 2 are good examples of var. C, *marcia*, and vary between themselves considerably, as is usual with that variety. But the other 2 are fine examples of "suffusion," the colors on either side blending, and the definite markings characteristic of the species being lost; also the black color of hind margins of upper side is hoary or griseous. These are such examples as collectors prize as the gems of their collections when taken in the field.

Of lot 2 (exposure 30 to 60 minutes) emerged 5 females, no males. Three are very little, if at all changed, but the other two are very pretty examples of suffusion, though to a less degree than the two before mentioned from lot 1, and the running of the colors is mostly restricted to the under side. The black margins on upper side are, however, much broader than in the normal form, running into and absorbing the extra discal round black spots.

Of lot 3 (exposure 10 to 30 minutes after forming, but with three chrysalids two days after) there emerged two females, no males. One of these I cannot distinguish from the summer *thaws*, and I presume this was from one of the three chrysalids spoken of, though of course I have no certainty of it. But the other is a beautiful example of var. B, *marcia*, the under side of the hind wings being largely melanized.

It would appear not to be necessary that cold should be applied before

the newly formed chrysalis has fully hardened to effect a change of form in case of *tharos*. Last year I found that chrysalids which were exposed at 9 hours after forming changed fully as much as those exposed at 6 and 3 hours. The temperature then was maintained at about 40°, and for 7 days only, and the changes were complete in nearly all the examples treated, but there was no case of suffusion, as has appeared in the present experiment at temp. 33° continued for 20 days; though probably the length of this last period had little to do with the matter, and a much shorter time would have produced the same result. Even with the first experiment this season as related, with an irregular temperature ranging from 45° to 55° and perhaps higher, though no change of form resulted, the cold completely retarded the development of the imago, as the butterflies did not emerge till their full period had passed after removal from the ice.

I think the facts I have stated throw light upon the cause, or a cause, of the phenomena of suffusion, instances of which are recorded in books and are occasionally seen in the field. Severe cold, as, for example, the enveloping of a chrysalis newly formed with ice or snow as it lies under a rock or on the ground, would apparently suffice to cause a blending of the colors in the butterfly.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ADELA.

A. biviella Zell.

I have received both sexes of this species from Prof. Feraud, of Orona, Maine. It is a prettier species than *A. bella* Cham., with the fascia much more distinct. Zeller describes only the ♂. It has the head and palpi dark brown, with a very faint purplish tinge; the antennæ with annulations of dark purple and silvery white; the body and legs dark purple, the legs annulate with white; hind wings pale purplish with darker ciliæ; thorax and fore wings rich deep purple, appearing in some lights to be thickly

dusted with brightly scintillating golden scales; behind the middle of the fore wings is a straight white fascia, widest on the dorsal margin, darker margined before, and more faintly so on the costa behind; before the apex is another fascia which does not quite reach the dorsal margin, and which is dark margined before; Zeller represents this fascia as having a sigmoid outline, but in one of my specimens it is perfectly straight, and in the other scarcely perceptibly sigmoid. *Al. ex.* 7 lines.

The ♀ (a single specimen), now first described, differs only in having the hairs of the head straw yellow; those of the palpi whitish, and the second fascia reduced to a very short white costal streak. The antennæ are simple in both sexes.

A. bella Cham.

The fasciæ in this species are as stated in the original description in the apical part of the wing, only visible in certain lights and are very indistinct even then; perhaps it would be more correct not to describe them as fasciæ, but to say that the apical part of the wings is somewhat suffused or overlaid with golden, except three or four narrow indistinct transverse lines, which are of the general hue. In the ♀ the basal half of the antennæ are densely clothed with long scales.

Dicte (Adela) corruscifasciella Cham., CAN. ENT., v. 5, April, 1873.

A. Schlaegeri Zell., Bei. z. Kent, May, 1873.

In my judgment the characters of this and similar species are sufficient to distinguish them generically from *Adela* as represented by such species as *A. biviella*, *trigrapha*, *bella*, &c. Prof. Zeller's figure and description leave no doubt as to the identity of the species described so nearly at the same time respectively by him and by me.

Incurvaria mediostriatella Clem., Proc. Acad. Nat. Sci., Jan'y, 1860, p. 5.

Tinea auristrigella Cham., CAN. ENT., v. 5, p. 86.

I am satisfied that in *T. auristrigella* I have re-described Dr. Clemens' species, though I see no sufficient reason for separating it from *Tinea*. *T. iridella* Cham. will probably also be referred to *Incurvaria*.

PITYS.

P. fasciella, v. 5, p. 111, ante.

The former description of this species is not satisfactory. I therefore re-describe it as follows:

Palpi silvery white; the second joint of the labial pair has a narrow brown line extending along its outer surface; face white; vertex rufous; antennæ pale fuscous. Thorax golden brown above and with a golden brown streak or spot beneath the fore wings, which are golden tinged with brown, and the costal and dorsal margins are brown; before the middle are two large tufts of raised scales opposite to each other, the inner one brown and the outer one whitish or silvery gray, margined all around with brown, and there are two similar tufts in the apical part of the wing. There are seven small silvery white costal streaks, one before the first pair of tufts and another just behind it, and both pointing obliquely backwards. The third is smaller and placed just before the last two tufts, and is nearly perpendicular to the margin, and the other four are in the apical part of the wing; there are also seven small dorsal silvery white streaks nearly opposite the costal ones, the third dorsal one (from the apex) connected faintly with its opposite costal one. Ciliæ pale fulvous. *Al. ex.* a little over ½ inch. Kentucky.

XYLESTHIA.

X. Clemensella Cham.

The larva of this species bores in dead locust timber. It may be found abundantly emerging (as imago) from locust fence posts, about the middle of June, and is not uncommon as late as the first of August.

SEMELE.

S. cristatella Cham.

I find that I have occasionally referred to this species as *S. bifasciella*, by which name some of my specimens were labeled before it was published as *S. cristatella*. Probably there is not sufficient reason for separating it generically from the species placed by me in the genus *Pitys*. I am not sure but that two related species are confounded under this specific name, as in some of the species the wings seem a little narrower than in others, and, besides, have a golden spot or longitudinal streak within the costa near the base, and the tufts in the apical part of the wing margined with sordid white or yellow.

NOTE ON LARVAL VARIATION.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

In a paper on the Noctuidæ of North America (6th Ann. Rep. Peabody Acad. Sci.) I have stated that we should rather expect the acquirements of fresh character to be more apparent during the period of growth of the Lepidoptera. I have elsewhere (Bull. Buff. Soc., 1, 130) shown that there is proof in the excessive variation in the larvæ of a genus where the adults of the species are remarkably uniform in color and ornamentation, that the larva submits to independent and wide modification from the circumstances of its environment. Under this head I have suggested that all the cases in the Noctuidæ where the larvæ are very different and the imagos very similar of any two forms distinguished by geographical distribution (e. g., *Apatela psi* from Europe and *Apatela occidentalis* from America) may be ranked. And here the numerous cases cited by Gueneé from Abbot's drawings of the larva must probably be included. The case of these "representative" species is especially interesting and will receive in time a more thorough working out when we come to know the immature forms of more of our species.

In this first phase of larval variation we have the difference associated with a separate habitat.

In the next phase we have what Mr. Walsh calls a *phytophagic* variation of the larva. He has shown such to exist with *Hal. tessellaris*, and Mr. Hy. Edwards has shown it with regard to the Californian *H. Agassizii*.

Mr. Walsh's observations on *Sphingicampa distigma* and *Anisota bicolor* I have discussed some years ago, giving good reason to show that an error happened in the matter; the larva of his "*bicolor*" (♀ imagos) not having in reality produced the perfect insects with which he associated them. Hence the "generic" differences in the larvæ associated with "specific" identity in the imagos in this case assumed by Mr. Walsh do not in reality exist. But the phytophagic variation in *Halesidota* is not associated with a difference of habitat; and Mr. Walsh ascribes it to the food plant as the determining condition of the larval environment inducing the variation. The imagos cannot be distinguished.

We have again a third phase in the "species" of *Datana*. Here the variation in the larva is strong in the last moults, and the imagos though almost are not quite identical. The species may be separated without knowing the larva. The two nearest allied forms, *ministra* and *integerrima*, have the one uneven, the other even fore wings. The larva of the latter is black with long silky white hairs, wanting in the former, which remains striped. It must be remembered that in an allied genus, *Nadata*, the two species are also separable by the differing margin in the imago; the larvæ are yet unknown. In *Catocala* we have two forms, *C. crataegi* Saund. and *C. polygama* Guen., quite distinct in the larval and very near in the perfect state.

I have briefly brought these facts together here to show that larvæ are independently subject to variation. The small differences in the imagos are usually attended by much greater differences in the larvæ in the case of closely allied "species." An analogy in the differences between closely allied species in different genera is shown in *Nadata* and *Datana*. We may expect similar facts when the history of our *Cerurœ* becomes known, all bearing on the objective basis for all our "genera" and "species," although certain lepidopterists continue to insist on real distinctions between certain of these artificial divisions. The conceptions of one class of naturalists are treated as corresponding with Nature, the other, not; but with insufficient reason.

NOTES ON THE EGG, LARVA AND PUPA OF SMERINTHUS MODESTA.

BY ROBERT BUNKER, ROCHESTER, N. Y.

Egg—$\frac{1}{16}$ in. diameter; light green, translucent, smooth, circular, oblate or depressed. Hatched in nine days from extrusion. Larva—$\frac{1}{4}$ in. long; light green, slender; head large, round, slightly depressed medially; face pink, with a purplish tinge; extremity of the body dark sea-green, with a large wart or tubercle, pyramidal in form, upon which rests the horn.

1st moult—½ in. long, apple green, with a light yellow longitudinal stripe below the dorsal ridge; diagonal lines yellowish white: horn purple, straight, very short. 2nd moult—⅞ in. long; ⅛ in. diam.: rich dark green, finely granulated, giving it a beautiful velvety appearance; thorax adorned with two transverse crests or collars, studded with fine points tipped with white. 3rd moult—1¼ in. long; ⅝ in. diam., thickest medially; light green, otherwise unchanged. 4th moult—1⅞ in. long; 1⅛ in. diam.; light green, coarsely granulated, granules studded with fine white points, giving the skin a frosted appearance; crests on thorax much reduced in size. 5th moult—3 in. long; ¾ in. diam.; hind crest lost, anterior one much reduced; spiracles small, rust red: true legs brown; pro-legs brownish yellow; horn lost, except a mere rudiment: yellow longitudinal stripes very obscure.

Pupa 2 in. long; ⅝ in. diam.; dark chestnut brown, cylindrical, holding its size well to the sixth segment, thence tapering abruptly and ending in a point or thorn; head obtuse, thoracic portion round, not angular.

The habits of the larva are singular; before the 1st moult it is much inclined to wander, and goes looping along after the manner of the Geometers; after the 2nd moult it becomes sluggish. It is a voracious eater—in short, an accomplished gastronome. Its manner of feeding differs from that of any larva I have had the pleasure of rearing. It rests with its body stretched out at right angles to the edge of the leaf, and eats with its feet fixed on the side of the leaf, and as the food is consumed moves backward, and when the leaf is consumed to the mid-rib, leaves it to try its gormandizing propensities on a fresh one. As the worm, while feeding, rests as above mentioned, the reason of its leaving the leaf half consumed will be obvious; it would otherwise have no surface to hold on to.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Fourth Annual General Meeting of this Branch was held on Tuesday, 1st May, at 8 o'clock p. m.., at the residence of H. H. Lyman, Esq., the President in the chair.

The following report was read and adopted :

REPORT.

Your Council beg to present the Fourth Annual Report of the Society's operations.

They would refer with pleasure to the satisfactory progress of the Society in the study of our science, evinced by the steadiness with which the monthly meetings have been kept up, and the interesting and valuable papers read at these meetings. Solid progress has been made in the identification and classification of the insects of Montreal, and much preliminary work has been accomplished, the value of which will appear hereafter. The only cause for regret is that our number continues so small, but the zeal and perseverance of the present members go far to compensate for their paucity in number. Your Council entertain the hope that at no distant day our membership will be augmented by the addition of at least a few more students of our useful and interesting branch of natural history.

Twelve meetings were held during the year, at which the following papers were read and presented to the Society :

G. J. Bowles—" List of Eggs and Larvæ Described in the Seven Volumes of the CANADIAN ENTOMOLOGIST."

H. H. Lyman—" Notes on the Occurrence of *Argynnis idalia*."

F. B. Caulfeild—" List of the Geometridæ of Montreal."

W. Couper—" On *Phyciodes tharos*."

H. H. Lyman—" List of Some of the Geometridæ of Montreal."

F. B. Caulfeild—" Notes on Some Species of *Chrysomelidæ* Occurring on the Island of Montreal."

F. B. Caulfeild—" Notes on the Species of *Meloe* in Canada."

H. H. Lyman—" Entomological Rambles, Including Notes on Entomology at the Centennial Exhibition."

G. J. Bowles—" The Noctuidæ of Quebec."

G. J. Bowles—" Notes on D'Urban's Paper in the *Canadian Naturalist*, Vol. v., with Identifications of the Species."

Some progress has been made during the year in the compilation of the " Montreal Catalogue," and the names of 790 identified species are now

entered on the list, comprising 385 Lepidoptera, 367 Coleoptera, 4 Diptera, 15 Orthoptera, 16 Hymenoptera and 3 Hemiptera. The earnest co-operation of the members is requested by your Council in this work. There is no doubt but that it will be of immense value to future students and will form a lasting memorial of our labors.

The finances of the Society have engaged the earnest attention of your Council. They would recommend that the cash on hand be expended in books for our Library, under the direction of the new Council.

The whole respectfully submitted.

GEO. JNO. BOWLES, President.

Montreal, 1st May, 1877.

The following were then elected to office for the ensuing year:

G. J. Bowles, President (re-elected); H. H. Lyman, Vice-President; G. B. Pearson, jr., Secretary and Treasurer (re-elected); C. W. Pearson, Curator (re-elected); Council—F. B. Caulfeild, Robert Jack, W. Hibbins, jr.

After a pleasant conversation on Entomological subjects, and the examination of numerous specimens, the meeting adjourned.

G. B. PEARSON, JR., Secretary.

NOTES ON LEPIDOPTERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Scopelosoma Pettiti.

I have received from Mr. Fred. Tepper a fine and well marked specimen of this species, originally described by me (CAN. ENT., 7, 188) from specimens received from Mr. J. Pettit, of Grimsby, Ont. The new specimen, from Iowa, shows the continuous, even, diffuse and broad median shade very distinctly, running just inside the large reniform and absorbing its exterior orange annulet. The t. p. line has a costal angu-

lation and is otherwise even ; it shows black venular points ; the line itself is double and these black points contrasted with the pale yellow included space. The pale yellow s. t. line is thrice-waved. This species is allied to *S. Graefiana*, from which it may be distinguished by its smaller size, its more even wings, which want the terminal festooned line, its paler ground color, straighter median shade, smaller orbicular spot and more prominent subterminal shade. The hind wings are very pale yellow and show a faint subterminal reddish shade in addition to the faint and more irregular mesial line. Beneath this subterminal shade is indicated by fragmentary reddish scales superiorly on both wings. In *Pettiti* the mesial line on secondaries beneath is more flexuous centrally.

Californian Hepiali.

Although Mr. Stretch, in his "Bombycidæ of North America," gives *Behrensii* (fig. 6) as distinct from *montana* (fig. 7), large material, sent by Mr. Behrens, makes me believe that they are opposite sexes of the same species, which should retain the name *Behrensii*. The orange salmon-colored *Behrensii* seem to me the males, and specimens vary from the form described by Mr. Stretch, in which the insect is nearly concolorous, to the more usual form where two silvery fasciæ break the monotony of the wing. The bands composed of light colored spots are more or less visible in the males ; in the females (*montana*) with fuscous wings, they are more evident. One intermediate specimen (♀) is faintly tinged with reddish. The hind wings have the margins and veins orange in *Behrensii;* in the ♀ *(montana)* the wing is all fuscous, but this latter tint can be seen in the ♂ on the interspaces.

I have examined the species described by Mr. Behrens (Can. Ent., viii., 174). I think that the specimen alluded to but not separately named under the description of *sequoiolus* is the female of that species, following out the idea that the sexes differ more than usual in *Behrensii*, to which *sequoiolus* is allied. The form described by Mr. Behrens as *Baroni* seems to me distinct and not the opposite sex of *mendocinolus*. It may be known by the bands remaining grayish fuscous, while the interspaces are shaded with red, not orange. But if the silver bands are a male character this opinion may need revision. The small species *Lenzi*, and the larger *sequoiolus*, can be readily recognised from Mr. Behrens' description of them ; while *mendocinolus* seems to differ from ♂ *Behrensii* by the smaller size, fuscous hind wings and less brilliant color of the primaries.

Lithophane viridipallens, n. s..

♂. Very pale gray green; allied to *querquera*. Thorax and head immaculate pale green with a central black thoracic dot, as in its ally. Lines on primaries faint. Basal dash obsolete. Lines double. Median shade continued, blackish. Reniform smaller than in *querquera*, more constricted, with a less conspicuous interior ring. Subterminal line much as in *querquera*, but without the median and submedian black marks of that species. Terminal series of dots reduced. Fringes concolorous. Hind wings fuscous with whitish fringes. Beneath pale with common line and discal marks, and an almost imperceptible flush. Abdomen pale fuscous, beneath very faintly ruddy. Hab. Mass. (Mr. Roland Thaxter). Size of *querquera*, but differing in the fainter markings, the narrower reniform, while the hind wings are less ruddy.

Syneda Alleni, n. s.

♂. A beautiful species allied to *graphica*, but distinct by the orange yellow secondaries and under surface. Band on hind wings narrow, twice deeply scalloped, angulated on vein 2, where it is joined to the base by black scales along the vein; thick discal lunule. Primaries like *graphica* but more brown; the median shade brown and diffuse; the t. p. line notched below costa; the t. a. line running down to internal margin, slightly projected outwardly on submedian vein. Beneath bright orange yellow, with deep black bands joined and forming Y-marks on both wings. Larger than *graphica*, and a more striking species. *Expanse* 32 mil. Orono, Maine, Mr. Anson Allen, to whom the species is respectfully dedicated.

CATOCALÆ TAKEN AT SUGAR AT CENTER, N. Y.

BY JAMES S. BAILEY, M. D., ALBANY, N. Y.

The following list will show the order in which Catocalæ were taken during July and August, 1877, at sugar, and the number taken each day of each variety, in this particular locality. Center has proven itself rich in Diurnals, and now especially so in Catocalæ. It is singular, after working up the field thoroughly for several years, not a vestige of a Cato-

cala has before this year been seen by the writer. In fact their presence was doubted, until this season a caterpillar was seen. June 28th the first Catocala was captured *(C. Clintonii)*, and now, Sept. 12th, worn specimens of *antinympha* are seen, and good specimens of *relicta*, *amatrix*, *unijuga*, *habilis* and *cerogama*. The 10th of this month I took 22 *relicta* and 12 *unijuga*.

JULY.

23rd, 5; 25th, 1; 28th, 22; 30th, 4; 31st, 20.

1. C. Clintonii—2nd, 1; 10th, 2; 19th, 2; 21st, 1.
2. " polygama—7th, 1; 11th, 1; 16th, 2; 17th, 2; 18th, 3; 20th, 1; 21st, 2; 23rd, 1; 30th, 1.
3. " *var.* pretiosa—3rd, 3; 4th, 4; 5th, 1; 9th, 1; 10th, 5; 11th, 1; 12th, 2; 14th, 1; 16th, 7; 17th, 1; 18th, 3; 19th, 3; 20th, 1; 23rd, 2; 25th, 4.
4. " gracilis—2nd, 3; 3rd, 8; 4th, 2; 5th, 13; 11th, 49; 12th, 45; 13th, 35; 14th, 30; 16th, 40. Abundant from 17th to 31st.
5. " *var.* similis—13th, 5; 14th, 12; 16th, 28; 18th, 18; 19th, 31; 20th, 30; 21st, 52. Abundant from 23rd to 31st.
6. " ilia—7th, 1; 9th, 1; 10th, 3; 11th, 1; 14th, 4; 16th, 2; 17th, 1; 18th, 6; 19th, 3; 20th, 6; 21st, 7; 23rd, 1; 25th, 1; 28th, 3; 30th, 2; 31st, 2.
7. " unijuga—7th, 1; 12th, 2; 17th, 1; 18th, 2; 19th, 1; 20th, 4; 21st, 1; 25th, 2.
8. " epione—9th, 1; 19th, 2; 20th, 1; 21st, 1; 28th, 2; 30th, 1.
9. " briseis—11th, 2; 12th, 2; 13th, 4; 14th, 4; 16th, 1; 18th, 5; 19th, 4; 20th, 15; 21st, 21; 23rd, 13; 25th, 4; 30th, 8; 31st, 5.
10. " antinympha—11th, 1; 12th, 2; 13th, 4; 14th, 6; 16th, 3; 18th, 4; 19th, 13; 20th, 12; 21st, 33; 23rd, 27; 25th, 56; 28th, 4; 30th, 93.
11. " concumbens—14th, 1; 20th, 5; 21st, 6; 23rd, 2; 25th, 7; 28th, 1; 30th, 57.
12. " ultronia—11th, 1; 12th, 1; 14th, 1; 16th, 1; 18th, 5; 19th, 1; 20th, 2; 21st, 5; 23rd, 3; 25th, 5; 30th, 6; 31st, 2.
13. " praeclara—12th, 1; 13th, 1; 14th, 1; 18th, 1; 19th, 2; 20th, 1; 21st, 1; 23rd, 7; 25th, 12; 30th, 16.
14. " crataegi—12th, 1; 14th, 1; 17th, 1; 21st, 2.
15. " relicta—12, 2; 17th, 1; 18th, 3; 19th, 4; 20th, 6; 21st, 4;

16. C. androphila—16th, 1 ; 18th, 4 ; 19th, 6 ; 20th, 6 ; 21st, 20 ; 23rd, 9 ; 25th, 16 ; 28th, 24 ; 30th, 30 ; 31st, 45.
17. " grynea—17th, 1 ; 18th, 3 ; 19th, 4 ; 20th, 1 ; 21st, 1 ; 25th, 2 ; 28th, 6 ; 31st, 2.
18. " minuta—18th, 2 ; 21st, 1.
19. " *var.* parvula—19th, 1.
20. " Meskei—18th, 2 ; 20th, 1.
21. " coccinata—18th, 1 ; 20th, 1 ; 21st, 1 ; 28th, 1.
22. " parta—19th, 1 ; 20th, 1 ; 28th, 1 ; 30th, 1 ; 31st, 2.
23. " tristis—20th, 1.
24. " insolabilis—20th, 1.
25. " fratercula—20th, 1 ; 23rd, 2 ; 25th, 2 ; 28th, 3; 30th, 1 ; 31st, 1.
26. " *var.* " (suffused)—20th, 1 ; 23rd, 1.
27. " palaeogama—20th, 1.
28. " *var.* phalanga—20th, 1.
29. " cerogama—25th, 1 ; 28th, 1 ; 30th, 3.
30. " residua—25th, 1 ; 28th, 2 ; 30th, 2.
31. " piatrix—28th, 1.
32. " retecta—30th, 1.
33. " habilis—30th, 2.
34. " *var.*—31st, 1.
35. " faustina—31st, 1.
36. " cara—31st, 1.

AUGUST.

1. C. concumbens—1st, 3. Abundant from 3rd to 31st.
2. " androphila—Abundant throughout the month.
3. " antinympha " " "
4. " ilia—1st, 1 ; 7th, 1 ; 10th, 1.
5. " habilis—1st, 1 ; 3rd, 2 ; 4th, 1 ; 7th, 6; 8th, 8 ; 10th, 6 ; 13th, 8 ; 18th, 2 ; 20th, 11 ; 22nd, 4 ; 24th, 3 ; 27th, 5 ; 29th, 3 ; 31st, 6.
6. " ultronia—1st, 1 ; 3rd, 1 ; 6th, 1 ; 7th, 1 ; 10th, 1.
7. " polygama—1st 1 ; 3rd, 2 ; 20th, 1.
8. " residua—1st, 2 ; 3rd, 2 ; 4th, 2 ; 7th, 2 ; 10th, 6 ; 13th, 1 ; 20th, 2 ; 24th, 1.
9. " piatrix—3rd, 1 ; 7th, 1 ; 18th, 3.

10. C. relicta—3rd, 2 ; 4th, 1 ; 6th, 8 ; 7th, 13 ; 8th, 7 ; 10th, 42 ; 13th, 28 ; 18th, 11 ; 20th, 17 ; 22nd, 26 ; 24th, 43 ; 27th, 30 ; 29th, 37 ; 31st, 34.
11. " briseis—3rd, 1 ; 6th, 1 ; 7th, 3 ; 8th, 1 ; 10th, 4 ; 13th, 1 ; 18th, 3; 22nd, 3 ; 31st, 2.
12. " cerogama—3rd, 2 ; 4th, 3 ; 7th, 6 ; 8th, 1 ; 10th, 14. Abundant from 13th to 31st.
13. " cara—3rd, 1 ; 4th, 1 ; 7th, 2 ; 8th, 2 ; 10th, 7 ; 13th, 1 , 27th, 5 ; 29th, 1 ; 30th, 1.
14. " amatrix *var.* nurus—4th, 1 ; 6th, 1 ; 22nd, 1.
15. " unijuga—6th, 1 ; 7th, 1 ; 10th, 1 ; 22nd, 3 ; 31st, 13.
16. " epione—6th, 1 ; 10th, 1.
17. " praeclara—6th, 8 ; 10th, 6 ; 22nd, 3 ; 29th, 1.
18. " palaeogama—7th, 1 ; 13th, 1 ; 29th, 2.
19. " *var.* phalanga—7th, 2 ; 27th, 2.
20. " retecta—10th, 2 ; 13th, 1 ; 18th, 2 ; 27th, 4 ; 29th, 7 ; 31st, 5.
21. " amatrix—18th, 1.
22. " desperata—18th, 3 ; 20th, 4.
23. " obscura—20th, 1.
24. " subnata—20th, 1.

CORRESPONDENCE.

WHAT IS THE FUNCTION OF THE FORCEPS IN FORFICULA?

DEAR SIR,—

In looking at the authorities upon this subject, I find that Westwood says " they are weapons of offence and defence," but he gives no proofs. De Geer tells us " quand quelqu' autre insect approche du Perceoreille, il tache de le pincer avec cet instrument en courbant le ventra en haut ou vers le côté, *mais sans produire beacoup d'effet.*" That I can readily believe. Serville says " cette pince lui sert d' arme defensive, *quoique peu redoutable !*" That is also true—*peu redoutable—tres peu !* The consistence of the forceps renders them by no means a formidable weapon. But De Geer also says, " Le male s' approche à reculons de la femelle dont

il tâte le ventre avec sa pince pour rencontrer l'endroit par ou il doit s'unir à elle, &c." This is a more reasonable use of the instrument, but not the only nor most important one.

Last summer I had a good opportunity of observing the habits of this insect, for every night numbers of them came into my study window in the country, and lighted very conveniently upon the table at which I was writing. Each one of them, before he took flight, for they were active, would bend his body back and *lift up the short elytra with his forceps before the wings would expand,* and this they did invariably. They would do this a dozen times in as many minutes, and not one of them ever took flight without performing this manouvre. The forceps were not used to fold the semicircular wings, but only to elevate the wing covers before flying. I have examined a number of writers upon *Forficula*, but not one of them mentions this remarkable fact, which I observed for many consecutive nights, and I have no doubt of the truth of it. This, then, I believe is the real and perhaps only function of the instrument.

JNO. G. MORRIS, Baltimore.

EREBUS ZENOBIA.

DEAR SIR,—

On the night of the 6th of September, 1877, George C. Thomas took near Racine, Wis., a fine male *Erebus zenobia* Cram. On the night of the 15th of September I captured, in similar condition, a female of the same species. So far as I can learn, there is but one other instance of this species being taken in North America. H. Strecker says that one specimen was taken at or near Davenport, Iowa, several years since. The taking of this West Indian species at Racine is but adding another to the numerous instances where Southern forms visit us. I have repeatedly called attention to this peculiarity of the Racine fauna. Southern forms go much further north than they do east of the great lakes; especially is this true of birds and insects.

I send a photograph of the ♂. Expands 5 inch; ♀ 7 inch.

P. A. HOY, M. D., Racine, Wisconsin.

[We are greatly indebted to Dr. Hoy for the photograph of this rare and very interesting insect.—ED. C. E.]

FOOD PLANTS OF H. MAIA.

DEAR SIR,

I am reminded by Robert Bunker's remarks on the food plant of *Hemileuca maia* (p. 119 of current volume of CAN. ENT.) that in 1874, in a circular issued from the Department of Public Instruction of the State of Illinois, I wrote the following:

"Our savants in Entomological lore give Oak, Willow and Spiraea as usual food plants for the larvae of *Hemileuca maia*, but here, on or near these spacious marshes [along Calumet River, south of Chicago] these plants are scarcely abundant enough to warrant so numerous an array of the perfect insect. The unavoidable inference, therefore, is that either some other food plant is specially abundant in the locality, or else some other feature of the neighborhood which, perhaps, has hitherto escaped the attention of Entomologists, constitutes to them a strong attraction."

The tract of country alluded to is just such a swampy locality as Mr. Bunker speaks of in his communication. No doubt the list of food plants for these larvae is yet far from complete.

O. S. WESTCOTT, Racine, Wis.

DEAR SIR,—

From among numerous fine captures during this last season I mention the following as being of especial interest to many collectors, as they were taken in the Township of Roselle, New Jersey:

Sept. 1st—*Catocala marmorata*, *relicta* and *unijuga*. The former was resting upon a white oak.

The following Sphingidæ in larval form are secured; the first is of exceeding great rarity: *Smerinthus astylus* and *myops*; *Cressonia juglandis*; *Darapsa versicolor*.

GEO. W. PECK, 226 Pearl St., New York.

DEAR SIR,

I would suggest that the "seeming growth" observed by Mr. Aaron on the eye of *P. philenor* is nothing but the pollen of the flowers visited for honey by the butterfly. In this way Darwinists believe that cross-fertilization is effected in many plants, and they show also that such cross-fertilization is beneficial to plants.

A. R. GROTE, Buffalo, N. Y.

The Canadian Entomologist.

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A FEW COMMON WOOD-BORING BEETLES.

BY THE REV. C. J. S. BETHUNE, M. A., PORT HOPE, ONT.

Our Canadian wood-boring beetles, with the exception of a few somewhat minute species, belong to the two great families of Buprestidæ and Cerambycidæ. These include an immense number of different genera and species; in Crotch's List of the Coleoptera of North America (north of Mexico) there are enumerated the names of no less than 169 species of the former family and 552 of the latter: about one-third of these are found in this country. It is evident, then, that to give a bare list of all our Canadian species of wood-borers would occupy no little space, while a detailed description of them, if one were competent for the task, would fill many numbers of this journal. We propose, therefore, on the present occasion to merely give a brief account of the eight species depicted on the accompanying plate. These we have selected on account of their frequent occurrence in almost all parts of the country, and the consequent familiarity of their appearance even to non-Entomologists. Our readers will, we are sure, be pleased with the beauty of the figures, which have been admirably drawn upon stone by Mr. L. Trouvelot, of Cambridge, Massachusetts.

Taking the species in the order in which they are numbered on the plate, we come first to

1. *Monohammus scutellatus* Say—A Pine Borer.—This beetle, which derives its specific name from its conspicuously white scutellum, is of a shining black colour on both the upper and under surfaces, thickly punctured with irregular impressions: on the wing-cases there are, as shown in the figure, a number of scattered whitish spots of various shapes and sizes; these, on close inspection, are found to be composed of dense

short white hairs, which often become rubbed off and disappear; the thorax is armed on each side with a thick triangular spine; the antennæ are many-jointed, and about the same length as the body in the male, while in the female they are about twice that proportion. The size of the beetle varies from less than half an inch in the male to over three-quarters of an inch (exclusive of the antennæ) in the female. The larva is a large thick white grub, destitute of legs, divided into a number of well-marked segments; the head armed with a strong pair of jaws. The larva infests the Pine, after the timber has been cut or newly fallen, and often causes serious injury to it by boring large oval-shaped holes which extend for long distances through the interior of the log. The perfect insects appear in June, and are sometimes very abundant; we have occasionally found them swarming in great numbers on fallen pine trees. The insect is common throughout Canada and the neighbouring States.

2. *Clytus speciosus* Say (genus *Glycobius* Lec.)—The Maple Borer.—The colours of this remarkably handsome insect are deep velvety black and bright yellow. The figure represents its shape and markings so accurately that further description is unnecessary; the size depicted, however, is decidedly above the average. This wasp-like beetle is not very abundant, but may occasionally be found on Maple trees, which its larvæ infest both when growing in the forest and also when cut into cord-wood. The eggs are laid by the parent beetle on the trunk of the Sugar-maple during the middle of summer; when hatched the grubs penetrate through the bark and make long winding borings through the solid wood. Occasionally they are very destructive to young Maple trees, but on the whole they are not sufficiently numerous to be objects of dread.

3. *Orthosoma cylindricum* Fab.—A Pine Borer.—This large beetle is the commonest and best known of our wood-borers; its habit of flying through open windows into lighted rooms during the warm evenings of July, usually to the great alarm of the inmates, has caused its appearance to be very familiar to every one. It is one of our largest beetles, measuring oftentimes as much as an inch and a half in length by over a third of an inch in breadth. Its general colour is a chestnut brown, approaching black on the head and antennæ. The thorax is armed with three sharp spines on each side; each wing-case has three slightly elevated ridges running lengthwise for nearly the whole length; the eyes, which are

situated behind the antennæ, are enormously large and very conspicuous. The larva is a large fat white grub, with powerful jaws of a darker colour; it feeds upon the wood of the Pine, and from its size often injures the timber very materially.

4. Clytus robiniæ Forst.—The Locust tree Borer. (The synonymy of this insect has been rather perplexing; it is now included in the genus *Cyllene* Newm.; for a long time we were accustomed to call it *Clytus flexuosus* Fab., but the specific name given above has the priority. It was also long considered to be identical with *C. pictus* Drury, that bores into the Hickory, but the late Mr. Walsh proved satisfactorily that the two species are distinct.)—The general colour of this insect is deep black with light yellow stripes; on the head and thorax these stripes form narrow transverse bands, but on the wing-covers there is first of all a narrow yellow anterior edging (not shown in the figure), then a slightly flexuous stripe (not straight as in the figure); this is followed by a narrow zig-zag band forming a letter W across the wings, and three irregularly wavy and broken stripes; there is also a yellow dot at the tip, and broader stripes on the sides of the abdomen of the same colour. The antennæ are long and many-jointed, and of a dark brown colour; the legs are long and of a tawny hue. The larva is a whitish coloured grub, about an inch long and the thickness of an ordinary goose-quill, and is furnished with six very minute legs. When young it appears to bore chiefly into the sap-wood, but afterwards strikes off into the solid wood of the tree, perforating it in every direction. Its presence is early indicated by the little heaps of saw-dust extruded from the holes, and accumulated about the base of the tree.

The history of this insect is rather a curious one. For a little over a hundred years it has been known to inhabit the State of New York, its appearance and habits being recorded by some English Entomologists of the last century. About thirty years ago it was found as far west as Chicago, whence it spread throughout the State of Illinois, but it was not till 1863 that it reached Rock Island, about 200 miles further west, where —Mr. Walsh relates—it suddenly appeared in great swarms and utterly destroyed all the Locust trees. The first record we have found of its appearance in Canada is by Mr. Couper, who states (*Can. Journal*, 1855, p. 377) that he observed some Locust trees attacked by this insect in Montreal in September, 1855. In 1862 it began to be very destructive to the Locusts in Toronto, and for several years was excessively abundant

there. In 1873 Mr. Reed relates its appearance in enormous numbers at London, Ont.; now it appears to be generally distributed throughout this province, and occasionally becomes very injurious to these ornamental trees. The perfect insect, in the localities it frequents, may usually be found in September on the flowers of the Golden-rod *(Solidago)*, of which it eats the pollen, as well as upon the trunks of the trees it infests.

5. *Chrysobothris femorata* Fab.—An Apple tree Borer.—This insect belongs to the family Buprestidæ, while all the others on our plate pertain to the Cerambycidæ; the difference in shape and structure, and especially in the length of the antennæ, is very noticeable in the figures. The beetle, which may be found basking on the tree-trunks in the hot sunshine in the end of June or during July, is very lively when danger threatens and will take wing instantly if an attempt is made to catch it. Its blackish colour above so much resembles the bark of the tree that it readily escapes the notice of an ordinary observer; but beneath it is of a beautifully burnished dark copper colour, looking as if it were made of metal; beneath the wing-covers it is bluish. While the figure gives the shape of the insect very correctly, it much exaggerates its size, which seldom exceeds three eighths of an inch; the light spots on the wing-cover are also erroneous in being very much too conspicuous. The larva is a long flattened grub, with an enormously large flat head in proportion to the rest of its body. When first hatched from the egg it eats the soft sapwood of the Apple tree, but afterwards it bores into the harder interior. As it especially attacks young trees, it is often terribly destructive to newly-planted orchards.

6. *Saperda candida* Fab.—An Apple tree Borer.—This insect, which rivals the foregoing species in the injuries it inflicts upon Apple trees, is a pale-brown beetle with two chalky-white longitudinal stripes running from the head to the apex of the wing-covers; its under side, legs and face are also chalky-white, and its antennæ a little darker; its length is about three-quarters of an inch. The larva is of a pale yellow or whitish colour, with a brownish polished head and black jaws; it is destitute of legs, but like other larvæ of the same family, it is enabled to move in its burrows by the contraction and expansion of its well-defined segments; when fully grown it is about an inch long. It may readily be distinguished from the preceding species by its cylindrical and more symmetrical shape.

Thus far this most injurious insect has only been found in certain portions of this country, being very abundant in the Niagara district, and in the neighbourhood of Montreal and Quebec, but happily rare, or entirely absent, from almost all other parts.

7. *Monohammus confusor* Kirby.—A Pine tree Borer.—This fine beetle, which is especially remarkable for the extraordinary length of its antennæ, is, in our Pine regions, one of the most common and destructive of our insect enemies. Its general colour is an ashen grey, mottled with variable darker spots; the scutellum is white; there are also patches of whitish colour on the head, thorax and abdomen. These variations of colour, being due to a covering of very fine short hairs, which oftentimes are rubbed off, are not to be depended upon in the determination of the species. As in *M. scutellatus* (fig. 1), each side of the thorax is armed with a short thick spine. The length of the insect varies from three-quarters of an inch to an inch and a half—the average size being over an inch; the antennæ of the males vary in length from one and a half to three inches; those of the female are somewhat shorter. The larva is a large, white, somewhat cylindrical grub, destitute of feet. During the summer the female lays her eggs in crevices of the bark of the white and red pine, selecting for the most part timber that has been scorched by fire, or felled by the wind or the lumberman's axe; the larva when hatched soon eats its way into the wood, and before this period of its existence is closed it often burrows immense galleries through and through the solid interior. As it lives a long time in the larval state, the perfect insect is frequently only developed after the timber has been built into a house, and then suddenly emerges from its concealment to the great consternation of the inhabitants of the dwelling. The larva, when burrowing in the wood, makes a loud noise like the boring of an auger, which on a still night may be heard for a considerable distance. The species is very generally distributed throughout Canada and the Northern States; in the pine-growing regions it is often excessively abundant. The late Mr. E. Billings relates that he once saw a pine tree near Lake Clear, in the county of Renfrew, on which he calculated that there were at least three hundred individuals of this species, while numbers more were flying about in all directions. As the insect attacks the cut timber when left over summer in the woods, it is a very serious injury to the operations of the lumbermen of this country.

8. Oberea tripunctata Fab.—The Raspberry Borer.—We now come to the last insect on our plate; the figure is a good deal exaggerated in size, the length of the beetle being under half an inch, and its width one-tenth of an inch. Its colour is deep black, with the exception of the thorax above and the front part of the breast beneath, which are rusty yellow; on the thorax there are three small elevated black dots arranged in a triangle (not two only, as in the figure), whence is derived the specific name of the insect. The antennæ are nearly, if not quite, as long as the body. The beetles are usually found in July and the beginning of August; they attack all the varieties of raspberry, and come into gardens from the fields and clearings, where we have often taken specimens and observed their work. The mode of attack is peculiar: the first appearance of injury is usually manifested by the withering and drooping of the ends of the young shoots. On inspection, it is found that at the base of the affected part there are two rows of punctures, half an inch apart, running completely round the canes, and so girdling them that the supply of sap is stopped and the tops necessarily soon wither and break off. The parent insect begins by cutting with its jaws a series of small punctures side by side around the cane, six or seven inches from the top. As soon as the first row is completed, it turns round, and facing the other way, cuts a second row measuring the length of its own body. These two girdles being completed, it makes a small hole a little way above the lower girdle and deposits in it its small yellow egg. The whole operation occupies an hour or more. From this egg there hatches out in a few days a small yellow footless grub, which proceeds to burrow downwards, eating the pith of the cane and eventually causing its destruction.

In order not to occupy too much space, we have forborne to make any mention of remedies which have been applied with more or less success to combat the ravages of these destroyers. Should any of our readers desire information upon this point, we beg to refer them to the Entomological Society's forthcoming Report to the Legislature, which will include many particulars regarding these insects which we have not given above.

American Entomological Society—Notice of Removal.—The American Entomological Society has removed to the south-west corner of Nineteenth and Race Streets, Philadelphia, Pa., where all correspondence, &c., should be addressed. Chas. A. Blake is Corresponding Sec'y.

A NEW GENUS OF TORTRICIDÆ.*

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

In the early spring, from the middle to the end of April, Prof. Lintner and Mr. Hill have taken near Albany a rather small and inconspicuously colored moth, remarkable for its diurnal activity. At first sight I did not recognize it as belonging to the Tortricidæ, but on examination it shows the family characters and seems to be allied to the European genus *Cheimatophila*. But it is not vein 4, but vein 5 that is wanting on the hind wings, and the other characters sufficiently separate our species.

Exentera, n. g.

Sub-median vein of secondaries hairy above at base. Ocelli. Eyes naked. Antennæ of the male brush-like, of the female simple. Fore wings narrow, long, with parallel costal and internal margins; apices not produced; external margin short and even; 12-veined, all the veins separate; vein 1 furcate at base; 2 from median at two-thirds from the base; vein 7 joins the external margin below apex; 10 is thrown off nearly mid-way between 9 and 11. Hind wings 7-veined, 5 wanting; 6 and 7 from one point; 3 and 4 near together at base; 2 at three-fourths from the base of wing. Fringes moderate; ovipositor slightly exserted. Palpi bushy, third article moderate. Front hairy, thorax smooth, legs untufted.

Exentera apriliana, n. s.

♂ ♀. Concolorous, dark olivaceous fuscous, a little mottled, immaculate; hind wings smoky fuscous, sub-pellucid, paler beneath. Under the glass the fore wings and thorax are seen to be covered with whitish-tipped fuscous scales. Length of ♀ primary 11 mil.; length of ♀ body 9 mil.

* Prof. C. H. Fernald, Orono, Maine, is now engaged in the study of our N. Am. Tortrices, and I have relinquished to him my accumulated material for the purpose. I hope my friends will supply him with the necessary material to enable him to give us a full and much needed paper on the group.

SEXES OF HOMOPTERA LUNATA.

BY THOS. E. BEAN, GALENA, ILLINOIS.

For the purpose of further testing conclusions stated on p. 174 regarding *Homopteras lunata*, *edusa* and *Saundersii*, I have secured all observed at my sugar since the former writing.

There are 38 "*lunata*," 23 "*Saundersii*" and 18 "*edusa*." Having opportunity to examine these while fresh, I observed the anatomy of the sex organs in each specimen as captured. The result verified the view previously advanced—the *lunatæ* were all females, the *Saundersii* and *edusæ* all males.

In regard to the wing-markings, the comment already printed applies equally to this lot of specimens; in addition I may say that there appears to be somewhat greater variation of t. p. line among the females (*lunatæ*) than in the two series of males (*edusæ* and *Saundersii*).

A large proportion of these specimens—nearly one-half—were taken in September; of those obtained in previous years a majority were captured earlier in the season.

It will be noticed the numerical proportion between the sexes, and also between the two male forms "*Saundersii*" and "*edusa*," already printed, is pretty well sustained in the present lot. The proportion of about 4 "*Saundersii*" to 3 "*edusæ*" is perhaps a tolerable approximation to their relative abundance here, as it was during the past summer my aim to secure all observed.

A note from Mr. Grote advised examination of the frenulum. I have applied this test to each of the 162 specimens, with result confirming the conclusion already reached. This structure is uniformly simple in "*edusa*" and "*Saundersii*," and compound in "*lunata*."

NATURALISTS' DIRECTORY.—A new edition of this convenient publication is promised about May next. Besides containing as complete a list of the names of Naturalists as it is possible to obtain, it is to embrace a list of all the scientific societies in North America, their location, officers and active members. Any communications relating to this Directory should be addressed to S. E. CASSINO, Salem, Mass.

DESCRIPTION OF PREPARATORY STAGES OF NEONYMPHA SOSYBIUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Egg laid July 16th. on grass, the female being confined in a bag over a tuft of grass set in a flower pot. Shape nearly that of a semi-ovoid, the base being flattened and the sides at base rounded, the surface under a low power smooth, but under a higher seen to be covered with shallow thimble-like depressions; color greenish-white.

Hatched July 20th.

Young larva—Length .09 inch.

Shape cylindrical, but marked by five or six longitudinal tuberculated ridges; each tubercle sending out a clubbed white hair, some of which are curved forward, others back: color white: head much larger than second segment, rounded, bilobed, rather broader than long, the vertices without processes, pilose, shining black. Duration of this stage 6 days.

After 1st moult—Length .2 inch. Shape cylindrical, thickest in the middle, tapering evenly either way, so that 2nd segment is of about same breadth as 12th; tail forked: color light green: covered with fine white tubercles, arranged in longitudinal rows, not quite regularly, each tubercle sending out a white hair: the space between the two dorsal rows is rather broader than between the rows elsewhere, presenting a clear green medio-dorsal stripe; and at extreme edge of dorsum is also a green stripe, but narrower; legs, pro-legs and under side green: head considerably broader than 2, rounded, a little depressed at top, angular at the sides below; color green, darker than body, much covered with fine white, pubescent tubercles; ocelli and mandibles brown. To next moult 7 days.

After 2nd moult—Length .36 in. Shape as before, and similarly marked, the tubercles of unequal size; the largest arranged in the longitudinal rows, but many small ones placed on the ridges caused by the creasing of the several segments; color blue-green: head no broader than 2, yellow-green, shaped and marked as before. To next moult 6 days.

After 3rd moult—Length .42 inch. Stout, thickest in the middle, rounding somewhat dorsally; color pale green; on either side of the

darker medio-dorsal stripe the row of white tubercles forms quite a broad stripe, another one at edge of dorsum, and another at base, over feet; the head emerald green, shaped as before. To next moult 5 days.

After 4th moult—Length .56 inch. Without another moult this stage continued till maturity.

Mature Larva—Length .76 inch. Cylindrical, obese, thickest in the middle, rounded dorsally, and sloping slightly to 11, then rapidly to last segment, which ends in forked, divergent tails; color emerald green, much covered with fine yellow tubercles placed on the ridges caused by the creasing of the segments, and with larger tubercles disposed in longitudinal rows; each tubercle giving out a fine and short white hair; at base of body the stripe is more heavily tuberculated than on dorsum; on either side of a clear, dark green, medio-dorsal stripe is a tuberculated stripe, and another at edge of dorsum; under side, legs and pro-legs, nearly same green as above; head rounded, broader than high, bilobed, and but little depressed at the suture, somewhat flattened frontally, broader than 2, equal to 3; covered with yellow, conical, fine points, arranged in close vertical rows, and at same time in transverse rows also; the ocelli black, mandibles brown.

The larva suspended in form of figure 6. Duration of this stage 7 days.

Chrysalis—Length .4 inch; greatest breadth .1 inch. Cylindrical, the abdomen stouter than anterior portion; mesonotum rounded, carinated; the head case truncated, scarcely projecting beyond the mesonotum, slightly arched at top, narrow, beveled at corners; the wing cases flaring a little on dorsal side, the neuration of wings seen distinctly; color green, on the abdomen yellow-green; on either side of dorsum on abdomen is a small ridge, and on either side of this are three black dots, placed in pairs between the mesonotum and extremity; on either side below wing cases a brown stripe; the keel of mesonotum brown, and the wing cases are crocked along the principal nervures, and on the margin is a black dot at the end of each nervule. Duration of this stage 13 days.

This species is very common in this part of West Virginia, and is found over the Southern and Southwestern States and in Mexico. Here it is two brooded. It flies in company with *gemma* and *curytris*, keeping within the edge of the forest, or if in the open country, is always near timber. The egg is shaped very much like that of *curytris*, but still more

like the eggs of certain *Papilios*, *turnus* for instance, but is netted on surface like the former and unlike the latter. It is quite different from the egg of *nephele*, and the egg of *gemma* is globular. The young larva is very different from that of *nephele*, but as it passes its several stages the larva grows surprisingly like the corresponding stages of *nephele* both in shape and color, while at every stage it is very unlike *gemma* in these respects. It is less like *eurytris* in shape than *nephele*. On the other hand, the chrysalis is very like that of *eurytris*, wholly unlike that of *gemma*, and pretty near that of *nephele*. In these preparatory stages its affinities are with *eurytris* in egg and chrysalis, with *nephele* in larva, and as unlike *gemma* in larva and chrysalis as if the latter were an *Apatura*.

INSECTS FEEDING ON GLEDITSCHIA.

BY V. T. CHAMBERS, COVINGTON, KY.

Helice pallidochrella Cham., and *Agnippe biscolorella* Cham.

My observations on both of these species scarcely permit me to doubt that their larvæ feed in some way on the Honey Locust (*Gleditschia tricanthos*), though neither of them has been bred from the larva. I have, however, met with a larva from which I have not succeeded in breeding the imago, and which I believe to be the larva of one of these species. It is a *Gelechia*-like larva, about half an inch long, with sixteen feet, and feeds inside the seed-pods of the *Gleditschia*, on the honey-like substance found in them, and not, so far as I have observed, on the seed. Its head is very pale ferruginous, the other segments being of a pale apple green, with very indistinct darker spots. I have met with it in September and October, but have never found it in the old pods in the spring, wherefore I think it probable that it leaves the pods to pupate. It is most probably the larva of *H. pallidochrella*. This species will be considered —and is—a *Gelechia* in the wide sense—the sense in which it is a convenient receptacle for every species that cannot be better disposed of.

And as I had previously described a very different species as *G. pallidochrella*, I suggest for this species the specific name of *gleditschiæella*.

While upon the subject of species feeding on *Gleditschia*, I wish to call the attention of Coleopterists to two species of Buprestidæ which feed upon this tree. I have never bred either, and have met with each only once, one of them in the larval, the other in the pupal condition. The larva, which resembles that of a *Brachys* more closely than it does that of any other genus known to me, feeds inside the thorns, and is about 1¼ lines long. It is depressed and narrows rapidly from the third segment back to the tenth, the remaining segments being again dilated.

The other species feeds *in* the seed. The only specimen that I have met with was a dead pupa found in a seed in May. The entire contents of the seed had been consumed, and the pupa fitted the pericarp so accurately that it looked as if the contents had been metamorphosed into the pupa—as in a sense they had—while the pericarp itself was intact. In breaking open the seed the pupa was somewhat crushed, and it may prove not to be that of a species of Buprestidæ, but I think it belongs to that family. The pupa having so nearly the shape and size of the bean or seed of the *Gleditschia* is about three lines long by two wide, and depressed. There is no danger of mistaking the larva of *Laverna gleditschiæella* Cham. for that of either of these species.

In this connection I wish also to refer again to the very singular larva mentioned in the CAN. ENT., v. 8, p. 137, and to add to the account there given of it that the maxillæ are enormously developed and are used as aids to progression—not exactly as legs, perhaps,—but they are applied to the surface as if the insect was feeling its way with them. Their eyes are reduced to the merest points—indeed I am not sure that these points are eyes—and enclosed in the darkness of the thorn it has more use for "feelers" than for eyes. *Laverna gleditschiæella*, however, which likewise feeds in the thorns, has the eyes well developed. The other larva tumbles about helplessly on a plain surface, being unable to walk on it. It requires a tubular place or cavity like the inside of the thorn, where by arching its body the dorsal tubercles can be brought to bear on one surface, while its ventral legs bear on the opposite one, and then it progresses easily enough. Using what is called the live-box or animalcule cage by microscopists, placing the larva between the glass and its brass setting, it courses around actively, using its dorsal tubercles as legs. I have never succeeded in rearing it, and do not know to what order it should be referred.

Laverna gleditschiaella Cham. is much subject to the attacks of hymenopterous parasites in its larval condition. Yet it is difficult to understand how this is possible under the conditions of its larval life. The first traces of the larva are always found *in the pith* of the stem or branch of the tree, about an inch from the base of the thorn. I have never been able to understand how the larva gets to the pith without leaving some trace of its path from the outside of the stem. The egg must be deposited on the outside of the stem, because the ovipositor of the ♀ is too soft to be able to penetrate the bark and wood to the pith. It would seem that the eggs of the little chalcid parasites must be deposited on the microscopic larva of the moth as soon as it emerges from the egg, and before it has eaten its way into the branch, because it is impossible to understand how it can be done afterwards, as these little parasites are themselves so small that two of them placed end to end would not extend from the outer surface of the bark of the twig to the central pith, and their ovipositors are very short and not exserted. By some means, however, they do manage to reach the larva, and frequently in place of the lepidopterous larva one finds only its shrivelled integument and a dozen or more minute chalcid pupæ, looking as if they were plaited together so as to form a chain as long as the larva of the moth. Sometimes, too, one finds the imagines which have not been able to effect their egress, however they may have effected their ingress to the thorn. There are two other species of Chalcididæ sometimes found in a similar predicament, dead in the prison in which they were hatched. One of these in the imago state is about two lines long. I do not know whether these feed on the larva of the *Laverna* or on one of the other larvæ above mentioned. The *Laverna* larva eats its way to the base of the nearest thorn, usually about an inch distant, then up through its pith a short distance, frequently turning off into the nearest branch. It eats through nearly to the outer surface, leaving only the thin cuticle of the thorn, reaching this point in May, the egg having been deposited on the twig about July or August of the previous year. Here it enters the pupa state, and in ten days or two weeks the imago makes its appearance, the empty pupa skin being left projecting from the little circular hole where it has burst through the cuticle of the thorn. The imago is almost unicolorous, but it ranges from deep glossy brown very faintly bronzed, to a bright bronze or almost golden brown.

Dr. Schweinfurth mentions (*Heart of Africa*, v. 1. p. 98) and figures the thorns of an African Acacia which have a large swelling at the base

produced by some insect, with the little orifice from which it had emerged very much like that made by *Laverna gleditschiæella* in the thorns of the Honey Locust. The *Laverna*, however, produces no swelling of the thorn. On a journey previous to that detailed in the *Heart of Africa*, Dr. S. had planted in Cairo seeds of an Acacia which he had gathered in equatorial Africa. On his later journey these seeds had produced trees which bore thorns in which were the same swellings and the hole by which the insect had emerged, and the Dr. suggests the query whether the insect had survived in the seed ! ! or "how did it contrive to get to its tree in Cairo ?" The idea is novel enough that the insect was carried in the seed which survived its ravages, and in spite of them produced a tree, while the insect having been planted in the seed, managed to make its way through all the stages of the growth of the tree for so many years, and finally emerged from its thorn. As Dr. S. states that "it also occurred in several other situations" beside that at which he planted seed, a more reasonable theory is that the insect was there before he planted the seed. He does not inform us what sort of an insect it was. He mentions also a musical sound produced by the wind blowing into the holes in the thorns from which the insects had emerged. No sound, however, is produced by this cause in the thorns of the *Gleditschia*.

I have been informed that thorns of various species of Acacia (in a large sense) in Texas, New Mexico and Arizona are perforated by insect borings similar to those of *Laverna gleditschiœella* in the Honey Locust, but I have not been able to procure specimens of the insect architect. Prof. Sumichrast mentions similar borings in Acacias in Mexico (referred to in a volume of the *American Naturalist*—I write from recollection and cannot refer to the volume or page). These, however, like those of which Mr. Belt gives such an entertaining account in "The Naturalist in Nicaragua," were tenanted by ants, and according to Mr. Belt, the excavations in the Nicaragua Acacias were made by the ants, which in return for the home and shelter afforded by the thorns, furnished a standing army for the tree, protecting it from depredations by other animals. Two species of ants—a *Myrmica* very near *M. molesta* Say, and a *Formica (F. dislocata ?* Say) also inhabit the thorns of *Gleditschia triacanthos;* but I have not been able to learn that they render any sort of service to the tree, and certainly they do not excavate their own dwellings, but only appropriate dead thorns that have already been excavated by the larva referred to in the preceding pages—just as they might take advantage

of any other crevice or opening which promised the requisite shelter. The colonies of the *Formica* are much more numerous than those of the *Myrmica*, and the species varies so in color—from those in which the workers are of a dull dead black to those in which the thorax is of a honey yellow—that I at first thought there were three species. I became convinced, however, that there is but the one species. Each formicarium contained one ♀ and a number of larvæ, while the number of workers in some was less than a dozen; in others it rose to more than a hundred.

ON THE GENERA NOLA AND ARGYROPHYES.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

I have received from Canada (London, Mr. Saunders) a new and easily recognizable species of *Nola*, larger than *ovilla*, and in describing it, I have again gone over the characters of *Argyrophyes*, which I find to be allied to *Nola*, and not to belong to the *Geometridæ*. I have corrected my former observations on *Argyrophyes*, which I find to have been largely erroneous.

Nola sexmaculata, n. s.

♂ ♀. Fore wings with the apices produced, gray, like *ovilla* in color, crossed by three oblique dentate and very fine black lines. Costa at base marked with brown. Immediately beyond, at basal third, is a second brown mark, widening inferiorly on the cell. A third and larger, subquadrate, at the middle of the wing. These two last spots are seen to be very finely edged with white on the outside. Hind wings gray with white fringes and discal dot. Beneath sub-irrorate, fore wings gray, hind wings white with discal dot. *Expanse* 19 mil. Two specimens; in the male the antennæ are broken off; from what remains they do not appear to have been pectinate.

Argyrophyes Grote (Bull. B. S. N. S., 1, Plate v.)

The enlarged figures of the neuration (3, 2) I have given are incorrect and may mislead. I have made a fresh preparation of the wings according to Mr. Dimmock's method. The primaries are like Zeller's figure of *Nola confusalis* (fig. 43, *a*) except that the base of 6 is opposite 5 from the cross vein, as I have figured it. My diagnosis is correct except that for "9 from upper and outer angle of the cell to costa" it should read "just before the upper, etc.," and here my figure and description, which agree, are both wrong. Also 7 touches the costa just before the apex, not at apex. The hind wings differ from Zeller's fig. *b*, and agree with mine in that vein 4 is joined at right angles by a true vein to vein 3, and is nearer 3 than 6, as I have drawn it. My vein 4 is probably vein 5 of Heineman (1, 273). There is also one accessory internal vein on hind wings. I have referred the single species to the *Geometridæ*, but it should be evidently placed near *Roeselia* among the Lithosians. The neuration is so very variable among the European species that it might not be held generically distinct, but vein 5 is not thrown off from the middle of the cross-vein as given by Heineman for *Roeselia*, but is nearer 3 (4 wanting) than it is 6, and joined by a true transverse vein to the submedian, which is thus 3-branched, not as Zeller figures *confusalis*, 2-branched with 5 independent from the middle of the cell without a true connection with the submedian vein itself. I cannot now account for my errors in drawing the enlarged figures of *Argyrophyes*, except that the wings, which are very frail, were insufficiently cleared of scales, preventing me from getting an accurate view of the venation. The diagnosis given by me (l. c. 175) should be amended to read as follows:

Argyrophyes, n. g.

Ocelli wanting. Maxillæ short, concealed by the prominently long, very thickly scaled palpi, which exceed the front, their third article directed forwards. Wings full; primaries large with evenly arcuate costa, straight external, and consequently long internal margin; 10-veined; cell long, incompletely closed; 2 to 5 at decreasing intervals; 5 from the cross-vein near 4; 6 from the cross-vein near 4 and opposite 5; between 5 and 6 the cell is incompletely closed by an angulated fold; 7 to costa just behind apex; 8 out of 7 to costa; 9 just before the upper and outer angle of the cell to costa; 10 and 11 wanting. Hind wings rounded, 7-veined; cell incompletely closed; two internal veins counted as one;

median 3-branched; vein 4 wanting; 5 joined to median at right angles from a true vein, the commencement of the cross-vein; 6 and 7 together from a point beyond the closure of the cell; 8 out of 7 near the base. ♂ antennæ simple, scaled, ciliate beneath.

Argyrophyes cilicoides is chalk white; the basal half of primaries white; on the outer half of the wing the terminal portion of the median space is shaded with smoky, enclosing a raised blotch of black metallic scales at the extremity of cell. A waved smoky subterminal line dividing the white terminal field and very near the margin. Beneath the primaries are smoky except along internal margin at base. Hind wings white with a smoky shading within the fringes; beneath with a faint dot. Body white. *Expanse* 16 m. m. New Jersey. I find that my two specimens were males.

Very near to *cilicoides* is *Nola nigrofasciata* of Zeller, Taf. 2, fig. 1, but it is impossible that it is the same. The color of the band is "brown" and it occupies the middle of the wing, and is well defined in Zeller's figure. In *cilicoides* there is no middle band or median space, but the smoky shading is limited to the outer part of the median space without the usual place for the median shade line. The narrow exterior line is evenly arcuate to submedian fold. The white terminal fields are narrower than in *nigrofasciata*.

But I have a species received from Mr. Goodell, Amherst, Mass., the specimen numbered 602, which closely agrees with Zeller's figure and description except that it is a little larger (19 mil.). The median band is not quite separated at its submedian constriction, but this is an ordinary varietal character. Else it agrees perfectly. There is the dot on median vein at base and costal shade (entirely wanting in *cilicoides*), and the faint mark before the inception of the subterminal line. No doubt can remain on my mind that I have Zeller's species before me. Now this species has been evidently re-described by Mr. Morrison, Boston Proc., 154. 1874, as *Eustrotia obaurata!* But the palpi are the palpi of *Nola* and not of *Eustrotia*. They are rather the palpi of *Argyrophyes*, being longer than in *Nola* and with a more pronounced upward curve. The vestiture is wholly scaley and not like that of *Eustrotia*. And the ocelli are wanting. All doubt fades when we come to examine the neuration. *It agrees precisely with Argyrophyes*, and just in those points, accordingly, where *cilicoides* differs from *centonalis*. The median vein of secondaries is 3-branched, vein 4 wanting, vein 5 joined at right angles by a true vein

and nearer 3 than 6; vein 8 is thrown off near the base of the wing. A second species of the genus *Argyrophyes* will then be:

Argyrophyes nigrofasciata Zeller, Beitr., 1, 8, Tab. 11, fig. 1 *(Nola)*, 1872.

Eustrotia obaurata Morr., Proc. Bost. Soc. N. H., 154, 1874.

My specimen is a female. Zeller describes and figures the male, which seems to differ unimportantly.

We have here two white species which seem to differ from all known species of the group in the squarer primaries, longer palpi, more rounded secondaries, and in the details of the venation. The ornamentation is remarkable for the metallic scales accompanying the discal spots.

In a forthcoming paper I hope to be able to give corrected drawings of the venation of *Argyrophyes*.

In describing *obaurata* Mr. Morrison does not mention the black dot at base of primaries, and he calls the median space "blackish gray"; Zeller calls it "brown." In the specimen before me it seems to have an olive cast; it would be described as "obscure olive-brown." The scattered metallic scales are very obvious. In Mr. Morrison's description I find no mention of the ante-marginal shade line. But the rest of the description is accurate, and I recognized this species from it in Mr. von Meske's collection at Albany.

ENTOMOLOGICAL PINS SEIZED FOR DUTIES.

For some years past our Society has kept a small stock of Entomological pins, not for the purpose of gain, but for the convenience of our members, many of whom, in the United States as well as in Canada, have obtained their supplies from us in small packages transmitted through the mail. Recently the custom house officer at Detroit seized several packages of these pins, and demanded for their release charges amounting to more than their value. This action, it appears, was prompted by a special circular from the Treasury Department at Washington to the collectors, requiring increased vigilance in regard to packages transmitted by mail—to prevent loss of revenue to the Department.

On being informed of the seizures, we wrote to the Secretary of the Treasury, explaining the objects of our Society in this matter, referring to past usage and also to the fact that these pins were only used for scientific purposes. In reply the Secretary holds that Entomological pins must take their place alongside of other pins and pay a duty of 35 per cent., and that the transmission of such packages by mail is contrary to law. At the same time he kindly instructed the collector at Detroit to waive the usual charges on seized goods and deliver the pins in his possession on payment of duties only. We shall hence in future be prevented from supplying our members in the U. S. with pins by parcel post.

On enquiring from the collector as to whether small quantities of pins might be sent by letter postage, we received in reply a copy of the circular sent from the Treasury Department. As this circular speaks only of *packages*, we presume that pins in small quantities enclosed in letters, covered by the usual letter postage, will not be interfered with.

Sheet cork, which is liable to a duty of 30 per cent., will also, we understand, be subject to seizure, but since the packages we send seldom exceed fifty cents in value, we do not know whether they would be regarded as of sufficient importance to warrant the trouble of the correspondence attending such seizures. On this point we have applied for information, but have failed to obtain it. Any packages of this sort sent in future will be at the risk of the parties ordering them. Either pins or cork can be safely sent in any quantities by express, subject to the duties mentioned.

CORRESPONDENCE.

CATOCALA MARMORATA.

Catocala marmorata may now safely be put down as one of the regularly settled species of this locality. An intimate friend and fellow hunter, in company with myself, took five examples this season, which, with four I took last year, makes nine in all, which is a pretty good showing for a single locality of an insect which, though seemingly diffused over a large territory, is nevertheless one of the rarest of the genus it so royally represents. Mr. Charles Dury, who took one last year, reports another

this year at Cincinnatti; and Mr. Geo. W. Peck took one this season in New Jersey. This makes twelve in all that have been taken in the United States, besides the original one in the Collection of the Entomological Society of Philadelphia, that I am aware of. If others have taken it in other localities, I hope they will report. Some who have not seen the examples taken here and elsewhere, have hesitated to believe that they were the true *marmorata* of Edwards, but a glance at them is enough to convince any one of their identity. I have not seen the original type, but our examples tally exactly with the published description. It is a large, showy and uniformly defined species, entirely distinct, and cannot well be mistaken for or confounded with any other species.

JAMES ANGUS, West Farms, N. Y.

SPHINGIDÆ AT SUGAR.

I have taken the following Sphingidæ at sugar at Center, this season :

Sphinx choerilus.
" kalmiæ.
" gordius.
" hylaus.
" Abbotti.
" drupiferarum.
Sphinx myron.
" sordida.
" cinerea.
" Harrisii.
" lineata.
" luscitiosa.

JAMES S. BAILEY, M. D., Albany, N. Y.

DONATION TO ENTOMOLOGICAL SOCIETY OF ONTARIO.—We tender our sincere thanks to our esteemed correspondent, Mr. V. T. Chambers, of Covington, Ky., for a collection of named Micro-Lepidoptera kindly presented to our Society. This collection, which reached us in very fair order, consists of 66 species, and is a most welcome and valuable addition to the Society's cabinet.

The Locust Plague in the United States, by C. V. Riley, M. A., Ph. D. This is an octavo volume of 236 pages, with 45 illustrations, including several maps; published by Rand, McNally & Co., Chicago. It is handsomely got up and contains much valuable information on this important subject; it is, in fact, a digest or reproduction in a compact form of the material contained in the author's several valuable reports on this insect to the Legislature of the State of Missouri. Price, in paper, $1; cloth, $1.25. Sent by mail by the publishers, prepaid, on receipt of price.

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